

JAPAN: ITS RESOURCES  
AND INDUSTRIES

HARPER'S GEOSCIENCE SERIES

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Carey Croneis, *Editor*



# JAPAN: ITS RESOURCES AND INDUSTRIES

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By

CLAYTON D. CARUS

*Professor of Foreign Trade at the  
University of Southern California*

*and*

CHARLES LONGSTRETH McNICHOLS



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TO VALLANCE CARUS *and* ELIZABETH MCNICHOLS



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## Editor's Introduction

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*The Carus-McNichols volume on Japan is the fourth in the Harper Geoscience Series, and the first which is concerned with geographic factors other than the cartographic. Moreover, although the avowed purpose of this book is to deal with the fundamental Japanese natural resources, much of the geography involved is not that which lies closest to geology—rather it is that type of earth science which is near kin to economics and social science.)* In short, it is Human Geography with a commercial-political slant. As such, *Japan: Its Resources and Industries* should fill a particularly urgent Allied need because there has heretofore been essentially no readily available authoritative compendium of this type dealing with our bitterest enemy.

Although written as a textbook which should be especially valuable to all of the many thousands of young Americans who will ultimately be trained for post-war Pacific and Asiatic administrative and occupational tasks, *Japan: Its Resources and Industries* should also be of compelling interest to the intelligent general reader. In addition, this book is virtually “essential reading” for all of those numerous persons who should be concerned with the great possibilities of post-war trade between North America and Asia, and with the potential impact of a conquered, but nonetheless energetic Japanese people upon that future trade.

*Japan: Its Resources and Industries* should prove of interest and value to these and other diverse groups of readers because it has been written in an extremely interesting fashion. This fact is not in itself unusual; but it is still a little out of the ordinary to discover authors who can be genuinely interesting without in any way sacrificing the all-too-seldom achieved combination of text values to be found in the preservation of accuracy and in the incorporation of a wealth of detail. Despite the great and obvious difficulties involved

in achieving such an end, the volume is also essentially up to date. No effort has been spared in assembling the photographs, and the maps and charts have been prepared with unusual care. The writers, however, have made no attempt to conceal the fact that much information which would have been helpful has been unavailable. Moreover, they have been careful to point out that some of the data that they have been ingenious enough to obtain has to be accepted with certain reservations. Despite all of the varied difficulties which confronted the authors, however, the volume which has resulted from their labors represents a penetrating analysis of Japan and things Japanese. Especially is this so because in the case of almost every topic discussed there has been an unusually successful attempt to draw aside the Japanese ubiquitous twin veils of secrecy and deceit.

For all of the above reasons we are perhaps being not too sanguine if we predict that *Japan: Its Resources and Industries* not only will take its place as an eminently readable yet scholarly contribution to the meager American literature on Japan, but that, much more to be hoped for, it may also prove to be of real value to all those persons who are now, or may be in the near future, directly concerned with our grievous problems in the western Pacific and in eastern Asia.

CAREY CRONEIS

## Preface

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The absence of any extensive and definitive books on the resource patterns and industrial strength of Japan in any language, together with the present significance of that area, is the primary justification for presenting this book. Fortunately we had accumulated much material on these subjects through the years and we were able to acquire considerable data just prior to and even during the war.

Evaluating information on Japan's resources was considerably complicated by the well-known evasiveness and indirection of the Japanese, but fortunately there were usually several independent sources that could be checked one against the other. One bureau or agency frequently took upon itself to boast about industrial achievements that another sought to conceal. Again, it was sometimes possible to ascertain the facts by a careful study of the wording of a statement in the light of the known conventions of Japanese subterfuge.

For the reader who wishes to go into the subject more intensively, the primarily unacademic bibliography should be helpful and informative.

CLAYTON D. CARUS

CHARLES LONGSTRETH McNICHOLS

*Los Angeles, California*  
*January 19, 1944*





JAPAN: ITS RESOURCES  
AND INDUSTRIES



# Introduction

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*The disadvantage of writing a handbook on Japan's resources while the nation under survey is still at war is outweighed by the immediate needs for such a book by future administrators of occupied territory, students of foreign trade, and business men, all of whom will have to prepare now for the early post-war period when transpacific sea lanes and air lanes will carry an unprecedented traffic load incident to reconstruction in Asia and the revival of trade between Asia and North America.*

Japan will remain a leading factor in American-Asiatic trade because the tightly grouped islands that make up Japan proper lie directly athwart the path that ships must take from the great ports of the United States and the Asiatic mainland. In spite of the largest possible loss she might sustain in this war Japan will still have about 70,000,000 inhabitants and the greatest industrial capacity in all Asia. These people must continue to use this capacity in order to make a living, unless we are to take the same barbarous attitude toward them that the Germans took toward the Jews, and exterminate them.

If, on the other hand, we deal with the Japanese in the same manner as the Allies dealt with the Germans after the First World War—allow them to retain unrestricted control of their homeland, with its great strategic importance and rich commercial and industrial resources—they will begin building another war machine before the ink on the articles of capitulation is dry.

For these reasons the security of the whole Pacific area depends on the adequate reconstruction of Japan. This must be predicated on five conditions.

1. A complete military defeat and the subsequent occupation of Japan proper. This is the only cure for the megalomania that has become a national obsession.

2. Allied administration during the period of reconstruction and reorientation *which must be completed before any treaty is concluded.*

3. Demonstrable evidence that Japanese industry, as reconstructed, is not of the sort that can build up another war machine.

4. Some readjustment of social values, with due regard to the fact that any too extensive rupture with the past will result in disastrous chaos. A complete reorientation of primary and secondary education, and a rise in the social status of the women, which is always an important factor in any decline in birth rate, are certainly indicated.

5. The immediate abolition of all subsidies to uneconomic industries and the removal of the tax and debt burden from other industries, notably agriculture.

It cannot be too strongly emphasized that much of the tremendous cost advantage the Japanese industrialists have enjoyed has been due in a large degree to subsidies, direct and indirect. The subsidized industries were those that competed with foreign industries, first at home and then in the world market. Once these subsidies are removed, not only will grievous inequalities at home be remedied, but the world-wide antagonism against Japan as a piratical competitor will abate.

The factor of low labor costs in Japan has been overemphasized, but a rise in wage standards will contribute to the same end. The great loss of man power sustained during the war will probably tend to bring this about automatically.

While it can usually be assumed that war has a surprisingly small effect on the over-all picture of the resources of a nation or a given area, the situation in regard to Japan is unique. Japan's resources are (1) in her strategic commercial position; (2) in her clever and industrious population; and (3) in her well-developed and carefully organized industries. The war cannot impair the first; on the contrary, it will probably be strengthened because of the increased traffic between North America and the mainland of Asia. However, the war certainly has resulted in serious losses in the other two categories.

Japan's expenditure of man power has been prodigious, not so much a gross loss of men on the fighting line as a wastage of administrators and experienced technicians. In order to organize production in her quickly won conquests in the Indies and the South Pacific, she drained many of her home industries and commercial organizations of much of their technical and administrative personnel and hurried these men south, packed into ships often inadequately conveyed because her naval commitments increasingly exceeded her

rapidly diminishing naval strength. Many of these irreplaceable experts were lost en route. The steamer *Taiyo Maru*, for example, was sunk off Hong Kong in May, 1942, and took to the bottom 600 executive employees of the great Mitsui organization who were bound for Java to take over the economic reins in that area, a task for which the Japanese army, officered by men notoriously ignorant in all things but war, was entirely incapable. Those who arrived at their destination were found to be more vulnerable to tropical diseases than the soldiers,<sup>1</sup> though the casualties suffered from disease by the army were high, in spite of Japan's marked progress in bacteriology and preventive medicine.

Losses in human resources within Japan proper are undoubtedly great, though they are incalculable at this time. The standard of living for the great mass of the Japanese has been decreasing for several years in direct proportion to the increase in her military and naval establishments. There was an accelerated downward trend after 1938 when the government began to abolish most of the nation's production for civilian needs. Food for civilians, already admitted by several government agencies to be inadequate in fats and proteins, was reduced about a third by the end of 1941. Reduction continued throughout the war. Civilian clothing was reduced in both quantity and quality. Domestic fuel was rationed to a point where home heating was almost impossible.

The result was a great increase in Japan's normally very high death rate from pneumonia and other respiratory ills, and an increase in deficiency diseases that not only has raised the current death toll but will cause widespread crippling of individual productive capacity throughout this entire generation of Japanese workers.

Add to this the loss of life and limb incident to the bombing and burning of cities and the subsequent invasion of Japan, both of which will be absolutely essential to the successful conclusion of this war, and the probably considerable loss due to the effect of the psychic shock of defeat on a population that has been so thoroughly conditioned to victories and to the doctrine of divinely ordained triumph, and the result will be an over-all decrease in human resources that will probably be unequaled elsewhere, even in Germany.

The physical damage to Japan's manufacturing industry as a result of the war may yet be considerable. To it must be added the very considerable loss resulting from the necessary liquidation or re-

<sup>1</sup> Broadcast by Station J.O.A.K., Tokyo, 1942.

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orientation of many uneconomic industries that Japan has maintained by subsidies for military or other strictly nationalistic purposes.

Because of these losses, in some cases it is impossible to write about Japan's resources in the present tense. Rather it is necessary to state what they were according to the last available pre-war data and to indicate what changes will result from the war and post-war reconstruction.

## I.

# Resources Inherent in Japan's Position and Conformation

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For the purposes of this book Japan can be defined as that part of the former Japanese Empire where the great majority of the inhabitants speak Japanese, this excludes Sakhalin<sup>1</sup> in the north and the Luchu group in the south, but includes everything between. It is a long crescent-shaped group of four large and numerous small islands that lie off the eastern coast of Asia between 30 and 46 degrees north latitude and 130 and 146 degrees east longitude; the total land area is about 145,000 square miles—some two and a half times the size of New England, not quite a third larger than Great Britain, and slightly smaller than the state of California. This was Japan at the beginning of her period of diplomatic and military expansion in the 1870's, and will probably be the Japan of the post-war world.

Thus these islands occupy about sixteen degrees of latitude somewhat south of the center of the north temperate zone, perhaps the optimum location for the development of human energy. On the two southern islands, Kyushu and Shikoku, and the Pacific slope of Honshu, the main island, the climate is humid subtropical—warm,

<sup>1</sup> Japanese place names and those of former Japanese possessions are frequently complicated, thus giving rise to considerable confusion

The largest Japanese island, sometimes referred to as the Mainland in Japanese texts, can be called either *Hondo*—the name of the geographic unit—or, more usually, *Honshu*—the political unit

The northern island is properly called *Yezo* and so appears on all the older maps. Of late the Japanese have preferred to call it *Hokkaido*, which is properly the name of a political unit that includes both *Yezo* and the Kurile Islands

The Kuriles are called *Chishima* by the Japanese and this name appears on some maps.

*Karafuto* is the Japanese name for Sakhalin

The Luchu Islands—spelled Loo Choo in some texts and maps—are *Ryukyu* in Japanese, Formosa is *Taiwan*. Manchuria is *Manchukuo*, of course, and Korea is *Chosen*

There are two or three names in common use for several Japanese rivers and some towns.

wet summers, relatively dry and mild but bracing winters—locally modified by extensive mountainous areas. Part of the Pacific slope of the northern extension of Honshu and nearly all of the slope that faces the Sea of Japan as well as all of the island of Hokkaido have variants of the New England type of climate, with late autumns, long snowbound winters, very late springs, and, in the southern half of that area, boiling hot summers comparable to those of western Kansas.

Great temperature variation, contributing to nervous énergy and physical stamina, occurs in about three-quarters of the area of Japan proper and all of the area is affected to a degree by violent climatic changes. Thunderstorms are prevalent and typhoons may occur any time from March to November. Every human being in Japan lives within sight of a mountain that may be from six to twelve thousand feet high; a man can walk from an orange grove on the shore of the Inland Sea to waist-deep snow on a pine-shrouded mountain pass in less than half a day.

About 85 per cent of the total area of Japan is excessively mountainous, a fact that has considerable bearing upon the nation's resources. A number of the more important peaks, including the much publicized Fuji, are volcanic and several of them were recently or are habitually active. Much of the island of Kyushu and the northern extension of Honshu is composed of volcanic formations.

Volcanoes have contributed somewhat to Japan's resources, in the formation of deposits of sulphur and abrasives. Recently active volcanoes have caused considerable loss of life and property. But together with the frequent and often destructive earthquakes they have exercised a profound psychological effect on the inhabitants. The people—nervously energetic, often cruel, subjected to hysterical acts of violence, and possessed of a deeply rooted admiration for the man who has the courage to take life, his own or another's—have the profound sense of insecurity that comes from the fact that the earth shakes under their feet and the mountains rain ashes and hot rocks. This has helped to make them a very cohesive folk, leaning strongly upon one another, more comfortable in a crowd than alone, more effective in group action than singly—hence more sensitive to group opinion. Above all, it has made them receptive to authority. To the Japanese the personification of authority is the Mikado, on whom they bestowed divine attributes in the hope or belief that he could give them, his loyal and valuable subjects, some



security against the capricious and unpredictable forces of nature that are themselves the ancient gods of the Japanese and the ancestors of the royal house.

Probably Japan's greatest single natural resource is the position of the islands in relation to the Asiatic mainland, directly athwart the great-circle routes between the principal Asiatic ports and those of North America, and the further peculiarity of the conformation of those islands that places the best harbors on their Pacific coast and gives that coast the most favorable soil and climate. Hence this area already had a great concentration of population and a considerable development of both commerce and industry long before the opening of the north Pacific trade route brought the world's ships just offshore.

Japan dominates the sea lanes to northern Asia more completely than Great Britain dominates those to northern Europe, as a map of the world will show. Britain's domination is weakened by the wide opening between Scotland and Norway at the northern end of the North Sea, whereas the whole of the Sea of Japan is truly a Japanese lake.

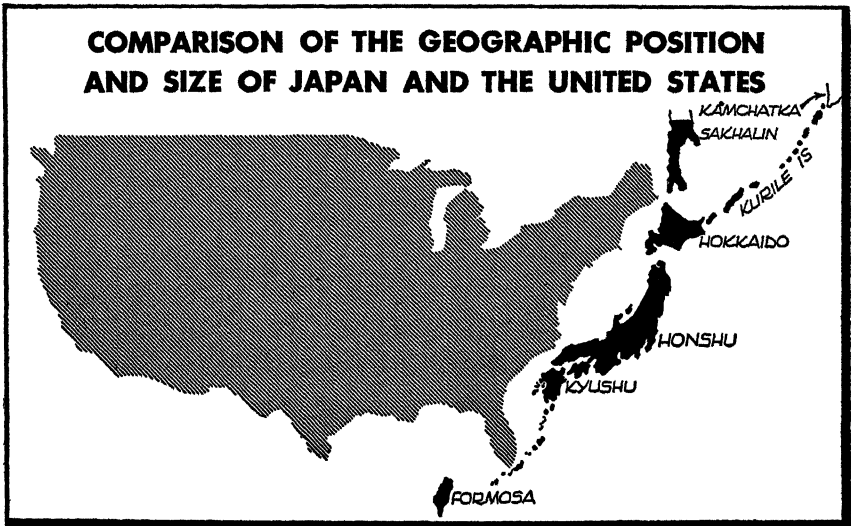
Furthermore, from Hokkaido, the northernmost of the four contiguous islands of Japan proper, there is a continuing string of smaller islands, called the Kuriles, that extends to the tip of the Kamchatka peninsula. These separate the Sea of Okhotsk from the Pacific. Japan acquired dominion over the Kuriles in 1875 and subsequently established naval and air bases on them, so the Sea of Okhotsk, immediately north of the Sea of Japan and extending above the 68th parallel, likewise became a Japanese lake.

South from Kyushu, southernmost island in Japan proper, extends a similar string of islands called Luchu by the Chinese, who held dominion over them for centuries, and Ryukyu by the Japanese, who seized control of them in 1879. The Luchus stretch all the way down to the big island of Formosa, seized by Japan in 1895. Formosa, renamed Taiwan by its conquerors, extends almost as far south as Canton and lies only some hundred miles off the coast of China. Japan's possession of these islands makes the East China Sea another Japanese lake.

Probably Japan will lose most if not all of her outlying islands. In any case, the destruction or radical curtailment of her naval and air power will nullify their effectiveness as controls on world trade. \ But as long as she has a large industrial population capable of sup-

plying goods and services to the world market, Japan proper will tend to dominate the commerce of the east coast of Asia.

To get a complete picture, imagine that Japan lies off the east coast of North America. The lower tip of Kyushu would be a little more than a hundred miles off Jacksonville, Florida. Kyushu's great



port of Nagasaki would be directly off Charleston, South Carolina, completely dominating the narrow sea between. The tip of the northern island, Hokkaido, would lie an equal distance off Eastport, Maine. The whole east coast of the United States would face on a landlocked sea into which there were only four entrances, those to the south and north, already indicated, one between Kyushu and Honshu opposite Cape Fear, North Carolina, and one between Honshu and Hokkaido off Cape Cod, both very narrow.

Add to this the fact that Japan's five principal port cities—Tokyo, Yokohama, Nagoya, Osaka, and Kobe—are on the far side of the main island and therefore much more accessible to the world's shipping than would be any of the ports on the continent, and it is easily seen that Japan would be in a position to cut off or dominate most of our east coast trade even though shorn of her naval and air power.

The Pacific is twice as large as the Atlantic and the length and conformation of the coast of Asia vary considerably from those of our Atlantic coast, but the parallel still holds.

Strategically the Japanese islands can be considered as one land traversed by two convenient channels for ship traffic, a narrow,

very mountainous land bent almost at right angles at 35 degrees north latitude near Tokyo Bay. No point in Japan is more than seventy-five miles from salt water and very few inhabited localities are more than fifty miles from some kind of seaport. Japan is a land of good harbors. Her 17,000 miles of coast line are a continuing succession of coves, bays, and estuaries. Thus the greater share of her domestic commerce can be cheaply transported by water. What is even more fortunate, there are a number of excellent deep-water harbors on the Pacific side, particularly on the lower or east-to-west extension of Honshu, the main island. Yokohama and Tokyo on Tokyo Bay, Nagoya on Atsuta Bay, and Kobe and Osaka on Osaka Bay become natural ports of call for all ships plying the north Pacific great-circle sailing route.)

Then, too, Shikoku Island, the fourth in size, fits snugly in between Kyushu and the southward-jutting Wakayama peninsula of Honshu. Between Shikoku and the westerly extension of Honshu is the narrow island-studded Inland Sea that begins at Osaka Bay and extends westward some 300 miles to Shimonoseki Straits. There are only three entrances to this all-important waterway and they all are exceedingly narrow, treacherous, and easily defended.

(The importance of the Inland Sea in the development of Japan's commerce and industry cannot be overestimated. Her shipping and fishing industries developed in its protected waters in primitive times. It was a safe avenue for the interisland commerce that must have played an important part in unifying the nation before the beginning of written history.) After the establishment of transpacific commerce in the second half of the last century it became even more important because it gave Japan a landlocked passage from Kobe, her greatest shipping port, and Osaka, her greatest industrial city, to the Yellow Sea and the Sea of Japan and the closest route to all the ports of north China, Manchuria, and southern Korea.

Position and conformation both give Japan a climate that is very favorable for intensive agriculture, her largest industry, and the development of hydroelectric power, which has become of increasing importance because her coal reserves have been greatly depleted by the war.

In summer extremely high temperatures in Manchuria and Mongolia maintain a constant thermal low pressure over that area toward which blows the southeast summer monsoon. This brings high temperatures and heavy rains during the growing season to nearly all

of Japan south of Hokkaido. In winter, when the plains and mountains of Manchuria and Mongolia are very cold, a high pressure is developed, causing a cold dry wind to blow from the northwest. This wind picks up considerable moisture as it crosses the Sea of Japan and this is deposited in the form of heavy snow along all the coast of Honshu that faces that sea and over all the mountainous interior. As the Pacific coast of Honshu and the islands of Shikoku and Kyushu are in the lee of Honshu's mountains and are somewhat protected by the mountains of Korea as well, and furthermore are influenced by the great northward drift of warm water from the south Pacific called the Japan current, the winters in those areas are quite dry and mild.

The amount and comparative certainty of the rainfall during the growing season, together with the natural water storage in the heavy snow on the still well-timbered mountains, makes possible an enormous production of rice in tiny flooded fields. Japan's food production has been almost sufficient for her own needs, and until recently it furnished a surplus for export, despite the fact that only about 12 per cent of her total land area can be cultivated.

High mountains and heavy snows, plus heavy to moderate summer rains, give Japan's short, swift rivers a large and fairly constant flow which means a maximum potential of hydroelectric power with a minimum of dam construction.

(Her situation gives Japan her exceedingly important fishing industry. The seas all around her are exceptionally prolific in marine life. Offshore fishing was developed early to supply her population with proteins that could not be raised on her restricted agricultural acreage. When Japan became industrialized she already had a large number of experienced fishermen who readily adapted themselves to the use of motorized equipment and began harvesting the entire Pacific from the Arctic to the Antarctic as efficiently as a farmer harvests a field of wheat. They not only kept Japan's rapidly growing industrial population supplied with the seafood that is such an essential part of its diet but furnished a large exportable surplus that has been an important factor in the country's expanding overseas commerce.)

It is important to emphasize at this time that Japan's commercial potential has two obvious factors: (1) production and (2) the utilization of the Asia-North America trade routes. The removal of restrictions that have hampered trade over these routes for many

years will mean that their use will be vastly increased. The Japanese ports will never remain mere way stations on these routes as long as Japan has seventy million highly productive inhabitants. That production must be reoriented to fit into a new pattern of world trade based on amity and a free flow of goods rather than one of uneconomic self-sufficiency, the accumulation of military supplies, and the capacity to produce armaments is, of course, obvious.

## II.

# Human Resources

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*Though we have given first place to the resources of Japan derived from her position and conformation, it must be pointed out that the resources of a given area take no place in world economy until they are exploited through human agency. Hence the human beings living within that area are themselves one of its important natural resources. Nowhere have human resources been so important as in Japan, where clever hands, acquisitive minds, unity of purpose, and a fanatical will to power have contributed so enormously to that nation's achievement of the commercial, industrial, and military dominance of the entire western Pacific.*

In a nation as in an individual, achievement is the product of certain qualities of mind and body, plus opportunity. The factors that gave the Japanese the opportunity to become a great power within seventy-five years were:

1. The development of the north Pacific trade route as a result of the rapid settlement of the west coast of North America and the great industrial expansion in the United States. As long as the Pacific was a vast, unknown emptiness, Japan was not on a great commercial highway but at the dead end of an unimportant alley.

2. The decay of China under the last of the Manchu Emperors and the confusion and disorders in the early years of the Republic. Japan built her empire at the expense of a weak China.

3. The contest for trade and domination waged by the European powers in the Far East, in which each of them, particularly Great Britain, sought at one time or another to strengthen Japan as a counterbalance against the other powers.)

How Japan came by the ability to exploit the opportunity thus afforded is a complex subject that can best be approached through a short survey of the racial make-up of the people and their unique history,

Japan has a more homogeneous population than any other large modern nation. There are probably 72,000,000 people in Japan

proper today, and of these at least 70,000,000 are racially and linguistically Japanese. Perhaps a million and a quarter Korean and Chinese laborers, most of them imported since the beginning of the Chinese war in 1937, are scattered through the industrial districts, and there may be a hundred thousand Europeans and half-castes still in the country. On the northern island, Hokkaido, there are some twenty thousand primitive non-Japanese aborigines, the Ainus, who are now even less important in Japan than the native blacks are in Australia. There are also the Eta, a pariah caste numbering about a million, which is entirely Japanese in language and racial type.

Physically the Japanese tend to be divided into two distinct types: the squat, sturdy, bandy-legged, button-nosed, pie-faced peasant, and the slightly taller, thinner, stooped, long-nosed, long-faced scholar and aristocrat. In both ancient and modern Japanese prints and in the popular plays all the servants, low comedians, and the like have round faces, short broad noses, low foreheads, and bowlegs. Conversely, all the heroes and beautiful women, regardless of class, are slender and delicate and have long narrow faces and high-bridged noses. By and large, the descendants of the old nobility and gentry—the daimios and the samurai—tend to conform to the aristocratic type, but the distinction does not always hold true; there are many gradations between the two, particularly in the cities.

The origin of these two groups is not known for certain, but there is some slight historical evidence that two distinct Mongoloid peoples came to Japan from Korea in the dim past, perhaps five or six centuries before Christ, one landing on Kyushu and the other on the north coast of the western tip of Honshu. There may have been one or more migrations of Malays or Indonesians from the south which contributed something to the characteristics of one group or the other, and there certainly was some amalgamation with the hairy Ainus, because Japanese men are more inclined to have beards than are most Mongoloids.

The synthesis of these elements into one race evidently took place while the Japanese were still confined to a comparatively small territory on either side of the western end of the Inland Sea. When it was complete, possibly as early as the first century A.D., they began to push the aborigines back along both shores of the Inland Sea. It is important to note that the Japanese were a race of small men,

much smaller in height and bulk than the bearded Ainus. Early Chinese accounts persistently refer to them as "monkey dwarfs." They were on the whole more intelligent than the Ainus, for the average intelligence of the Japanese is undoubtedly higher than the average for the human race, but their weapons and their entire material culture were little if any better. The fact that the Japanese have only Chinese words for numbers above ten gives a clear indication of the state of Japanese culture before the Chinese intellectual invasion.

Yet the Japanese defeated and dispossessed the larger, stronger Ainus because the latter achieved no stronger political organization than the tribal group, whereas the Japanese early attained unity under the authority of one ruler whose family firmly retained that authority.

Thus, long before the dawn of written history the Japanese had, deeply implanted, the concept that by unity under authority they could defeat larger, stronger men. That concept, plus a deep reverence for their ruler, whose family had been in authority so long that it was universally accepted as god-born, produced a strong, deep, narrow sense of nationalism that has survived to this day, unimpaired by more than one period of feudal anarchy and the two great sweeping tidal waves of cultural change that burst over the islands in the sixth and nineteenth centuries.

By the end of the fifth century the Japanese had occupied all of Kyushu, both shores of the Inland Sea, and most of the western extension of Hondo. Then, after some centuries of intermittent contact, the full impact of Chinese culture suddenly struck Japan when Chinese Buddhist missionaries were welcomed to the Mikado's court, bringing with them their system of writing, the Chinese contempt for warriors as a class, and the Chinese tradition that the Son of Heaven should be isolated from his subjects and his authority delegated through ministers chosen from within the court circle.

The Mikado soon ceased to exercise his own authority. He ceased to be a primitive warrior-prince, the actual as well as the titular head of the nation, and became a secluded oriental potentate who lived in his palace surrounded by priests and women.

However, the Mikado remained the head of the primitive racial cult called Shinto—the Way of the Gods—a combination of ancestor worship and reverential fear of the forces of nature.

Every Japanese worships at the shrine of his ancestors, praying to them for aid and guidance and answering to them for his deeds. The head of each family is the high priest of the family cult and is



n duty bound to inform his ancestors of the birth of a child into he family or any other event that affects its continuity or prosperity. The Emperor is himself in like communication with his ancestors. But his ancestors are the much-feared forces of nature—the sun, he winds, and the waters. He alone is their living representative and he alone can hold the proper ritualistic communion with them.

In spite of the fact that Buddhism is an inclusive religion that in no way interferes with its adherents' subscribing to other faiths, it was not considered fitting for the Emperor to become a practicing Buddhist while he held office. Hence the custom arose for the Emperor to retire in favor of a younger relative while he was himself comparatively young so he could devote himself to Buddhistic contemplation. This further weakened his capacity to exercise his own authority.

About 550 A.D. members of the Soga family, court nobles, became hereditary prime ministers and a hundred years later their authority, greatly augmented, came into the hands of another family of nobles, the Fujiwaras.

The student of Japanese affairs must continually bear in mind the all-important fact that from 550 A.D. until the present day the God-Emperor of Japan has perforce delegated his authority to others. At no time has he ever been deposed as the author and source of that authority, but at no time since has any Emperor been able to exercise it in his own behalf, or even to appoint those who exercise it in his name. Actual authority in Japan has since been vested in the man or men who have official "access to the throne," and this "access" has been successively gained by court intrigue, by inheritance, by violence, by political negotiation between those in control of various government bureaus, civil and military, and for a short period—and to a limited degree—by parliamentary sanction. Finally during the last decade it was attained by a military cabal by means of terror and assassination.

Those with the foresaid "access" make a decision as to national policy. They go humbly to the Emperor and inform him as to that decision, though this may be after they have already taken action that makes that decision irrevocable—as was the case when the Japanese navy attacked the United States on December 7, 1941. The Emperor perforce informs his divine ancestors of that decision and thereafter any subject of Japan who questions it is guilty of reason, lese majesty, and impiety.

Whatever its fallacy, this system has contributed greatly to na-

tional unity because when the strongest man or political combination in the nation once seized the reins of power, his or its position was immediately strengthened by divine sanction and the prospect of long civil wars between the successful and the defeated factions was greatly lessened.

The long period of Fujiwara domination—about five centuries—was important, for under this family the culture Japan so suddenly acquired from China was synthesized and developed and several new elements were added or adapted. The Chinese ideographs, developed to record a monosyllabic grammarless language, proved to be inadequate for agglutinate Japanese, with its elaborate grammatical forms; so two syllabaries were invented to make up for the deficiencies of the ideographs. The literati of the court stopped speaking and writing pure Chinese and developed for themselves an artificial language built up for the most part of words with Chinese roots<sup>1</sup> and Japanese word endings. This in turn gave place to a new Japanese that was about as different from the old primitive language as Middle English was from Anglo-Saxon and was not far from the literary Japanese of today.

A remarkable literary development occurred in the new medium, coinciding with an era of cultural brilliance during the regime of the last of the Fujiwaras. Most of the writers were women, ladies-in-waiting to various members of the royal family, the semi-royal Fujiwaras, or other court nobles. The most important single work was the "Tale of Genji"—*Genji Mono-gatari*—a sequence of novels written by Murasaki Shikibu sometime between 1008 and 1020, more than a generation before the Norman conquest of England, yet more completely modern in treatment than anything written in Europe before the end of the nineteenth century.

The book shows clearly how seriously each Emperor took his position as titular divinity and his ritualistic communions with his divine ancestors and how eager he was to pass on the burden of responsi-

<sup>1</sup> Japanese words with Chinese roots are "elegant," whereas those with native roots are "common." We have an almost exact parallel in English, in that we have abandoned many old Anglo-Saxon words entirely and barred others from polite conversation, adopting in their stead words of Latin or Norman-French derivation. The number of Japanese words with Chinese roots is constantly increasing through the coming of new words from two or more Chinese monosyllables. For example, the word *sekiyu* (rock oil) is a combination of two Chinese words meaning "rock" and "oil."

<sup>1</sup> This does not mean that the Japanese language is in any way comprehensible to a person who understands any of the modern Chinese languages. The Japanese borrow their root words from the old language of the classics, pronounce them in a strictly Japanese manner, and add Japanese terminations.

bility and circumspection to the next candidate. There were usually two or three ex-Emperors living in retirement in or near Kyoto, the imperial seat.

The picture Lady Murasaki gives of Japanese manners and certain aspects of the political situation cannot be ignored by any student who seeks an understanding of the Japan of today. Fortunately there is an excellent English translation.

Also noteworthy is the fact that the whole Kyoto court lived entirely remote from the rest of the country and considered themselves and even their non-noble servants as infinitely more civilized than the provincial lords and their warrior followers. But the warriors were already in actual control of the country and two rival factions among them were jockeying for position in a contest to determine who would finally seize the "access to the throne," and with it the central authority, from the now inert hands of the Fujiwaras. Incidentally, the Fujiwaras had become too closely akin to the royal family to be murdered or degraded.<sup>2</sup> Every Empress of Japan from the seventh century to the present time has been a Fujiwara princess.

The court party remained in cloistered seclusion at Kyoto, fostering the arts as much as its increasing poverty permitted, while the warriors it despised ruled the country. There were at this time some two hundred of these provincial lords, the daimios, each with his following of hereditary men-at-arms, the samurai. The samurai were roughly divided into two groups, the allies of the Taira family and those of the Minamoto. They were so evenly divided that each side had to compromise the central authority by giving more power to the provincial lords in order to win followers. This led to each daimio becoming a feudal sovereign who gave only lip service to him who held the "access to the throne."

This period of feudal semi-anarchy is important because it produced a sort of "cult of the warrior," called *Bushido*, that has had an important effect on modern Japanese history. This code was adopted by the militant nationalists of the modern period as their own.

The title of shogun was another outgrowth of the feudal period.

<sup>2</sup> When Prince Hummaro Konoye disappointed the military clique, which had been instrumental in his elevation to the premiership in 1939, by not making decisive demands against the United States and England, he was saved from assassination by the fact that his family is one of the several modern branches of the Fujiwaras and therefore he is so closely related to the royal family by blood that, unlike the ordinary politician, his person was inviolable.

Originally it was given to the leader of feudal levies against the Ainus, who still occupied most of the northern extension of Honshu. In 1185 one Yoritomo of the Minamoto family defeated the opposing faction in a battle and acquired the "access to the throne" and the title of shogun, which from that time on became synonymous with "hereditary regent." The court of these actual rulers of Japan was set up at Wakayama, south of Osaka, and the court of the Mikado at Kyoto passed into a period of increasing poverty and neglect.

At times the delegation of authority went a step further. For example, the Minamotos assumed the title of shogun in 1185 and retained the title until 1333, but the actual authority vested in it was usurped by a member of the Hojo family in 1205. The Hojos reigned as "regents" until 1333, always exercising the supreme authority in the name of some powerless Minamoto in the shogun's palace at Wakayama, who had received it in turn from some equally impotent but ever-sacred ruler in the Mikado's court at Kyoto.

Being vassals of the Minamotos, the Hojos would not commit the shameful treason of seizing the shogunate outright. They merely took over its administration when it became evident that the Minamotos were too ineffective to maintain it, thereby preventing the shogunate passing into the hands of a rival family. Further, to keep any rival from seizing the "access to the throne" by the direct process of seizing the Emperor's person, the Hojos maintained their own deputy at Kyoto, and when any such danger developed he respectfully but promptly removed the Emperor, usually a very young child, to some distant island that was securely under the control of the Hojo-Minamoto faction.

The actual power of the Hojo family, despite the fact that it was twice delegated, is shown by the fact that it was a Hojo who raised the forces that beat off the invasion attempt of the great Kublai Khan.

Later the Ashikagas seized the shogunate after a protracted period of civil war. Their court achieved great literary and artistic brilliance and with it the Chinese attitude toward warriors. As an apparently inevitable result, the Ashikagas lost the actual administration of the central authority to their subordinates. No strong family of "regents" arose among the followers of the Ashikagas and consequently the local nobles again grew strong at the expense of the central authority.

While the authority of the shogunate was comparatively weak and the local lords were exercising a quasi-independence in their domains, Saint Francis Xavier landed at the port of Kagoshima in southern Kyushu in 1549 and brought with him Christianity. Within the next few years the new faith spread amazingly. This was due to the process of converting one after another of the semi-autonomous local daimios and thereafter persuading them to outlaw all non-Christian worship within their domains. There were many individual conversions, however, and many converts remained sincere and devout until their death.

In the latter half of the sixteenth century three successive strong men arose to exercise the authority of the shogunate. The first, Ota Nobunga, who ruled in the name of the decadent Ashikagas, saw no menace in the growth of Christianity; in fact he found it useful in counterbalancing the growth of certain heretical, semi-military Buddhist sects that were causing trouble. He was succeeded in 1582 by the great Toyotomi Hideyoshi. Hideyoshi was likewise favorable to the Christians until he learned from a bragging Spanish sea captain how the monarchs of Portugal and Spain had used the Christianized natives in extending their empires through the East Indies and the Philippines.

Hideyoshi immediately started crucifying Christian missionaries. This was in 1597. That same year the last of the Ashikaga puppet-shoguns died and Hideyoshi himself died the next year. There followed a period of civil strife in which Iyeyasu Tokugawa set aside Hideyoshi's son and achieved "access to the throne" for himself and his descendants.

He succeeded in subduing or exterminating all the lesser lords; in many cases he replaced them with his own followers and so isolated the great lords of Satsuma (on Kyushu) and Choshu (the region around Shimonoseki) that they became powerless to oppose him. Thereupon he proceeded to exterminate Christianity, which he regarded as a national menace on two counts. It was a denial of the divine origin of the Mikado, the foundation stone of unity in Japan, and it was the opening wedge for foreign domination.

In spite of the fact that the Tokugawas were able to consolidate all of Japan under their authority, they were so fearful of Spanish Catholic domination that Iyeyasu's grandson shut the country off from all foreign intercourse except for very restricted traffic with the Dutch, who, being Protestant and anti-Spanish, were regarded as

non-Christian, and the Chinese. Both were allowed to establish small trading posts in Nagasaki Harbor.

Because the Japanese were prohibited from leaving their islands under pain of death and could no longer build ships larger than small coasting craft, the notion grew up in Europe that they had again lapsed into a state of feudal barbarism. Actually the central authority under the Tokugawa autocracy was as strong as that in France under Louis XIV, and there was a comparable aristocratic, post-feudal social organization. Each provincial lord, great or small, had to spend some time every year in the shogun's court in Yeddo and many of them had to maintain a relative in residence there as a hostage. All private wars were outlawed. Any lord who attempted to settle a dispute with his neighbor by force of arms was immediately liquidated. Otherwise the shogun maintained his power by a large and efficient organization of spies and censors whose methods were similar to those of the Japanese police during the years immediately preceding World War II. The few foreigners who visited Japan during the Tokugawa period reported that internal order was more stringently maintained than in any country in Europe at that time.

Violence was proscribed by the shogun's order; yet by the precepts of the warriors' cult to which each daimio and samurai was bound by custom, certain insults and even social slights could be expiated only by violence. Hence a gentleman under certain circumstances was forced by custom to break the peace and pay the penalty. Therefore he killed his enemy with the larger of the two swords he wore, and then ceremoniously killed himself with the smaller one which was reserved for that purpose alone.

This act, variously called seppuku or hara-kiri,<sup>3</sup> was really one of self-justification—though it was at times resorted to as a final gesture of complete loyalty to a dead or disgraced superior. He who killed himself in this manner saved himself and, more important, his fam-

<sup>3</sup> *Seppuku*—hara-kiri—literally, "belly cut." He who would justify himself by death ripped open his abdomen in a specific manner with the smaller of the two swords that every man of gentle birth carried. The custom is not ancient, but a development of the feudal period. Technically, women and non-sword-bearing commoners could not avail themselves of the full rite, but had to content themselves with strangling or drowning, but in later times hara-kiri might be committed by anyone. Women usually preferred throat cutting.

*Seppuku* is the "elegant" modern word for hara-kiri, being a compound of Chinese roots conveying the same meaning. The Japanese no longer use the older native term.

*Shinju*, suicide for love, is very common in Japan.

ily from disgrace and often saved his estate from confiscation. The only alternative was for him to flee with his family to the nearest Eta settlement, where the shogun's writ did not follow, but where he and all his descendants would become nameless subhumans entirely beyond the pale of organized society. Research conducted during the past century has disclosed that a good many Eta have ancient armor and old documents to prove that they were descended from degraded noblemen or warriors.

The most popular story in all Japanese literature is the "Forty-seven Ronins," which is being continually served up to the public in books, in motion pictures, on the stage, and in oral accounts by street-corner storytellers and radio narrators.

In brief outline, the story follows: Asano, the daimio of Ako, leaves his province to spend the usual period of enforced residence at the court of one of the Tokugawa shoguns in Yeddo (Tokyo). Here he is accorded the honor of receiving and entertaining an envoy from the Mikado's court. Asano is a simple warrior-prince well schooled in the "way of horse and bow (*Bushido*)" but not up on the intricate formalities indispensable to this assignment. So he goes to a Yeddo princeling named Kira and politely requests information and advice.

Kira expects to be paid for his information. The unsophisticated Asano, never dreaming that any nobleman would demean himself to accept money, does not pay. Kira heaps subtle insults on him and finally makes them obvious. Asano slashes him across the face with his sword and Kira runs for his life.

This is the only possible action Asano could take under the circumstances, but in so doing he has broken the shogun's peace in the shogun's own palace. He is ordered to commit hara-kiri that night. His estates are confiscated and his samurai "clansmen" thus become *ronins*, that is, landless gentry and masterless men.

Immediately forty-seven of them, under the leadership of Oishi Kurano-suke, enter into a conspiracy to kill Kira. Not to do so would mean eternal disgrace. To do so means certain death at the behest of the shogun. By the typical clan-council method they evolve a typically Japanese plan of action, elaborate and detailed, involving espionage, subterfuge, much patient waiting, and then a quick, ruthless attack.

Forty-six of the ronins scatter to various cities and become artisans—carpenters, blacksmiths, tailors, and the like. After they have grown proficient at their trades some are able to secure employment on the estate where Kira has exiled himself in fear of their vengeance. These spies refrain from any overt act but learn the layout of Kira's palace to the last detail.

Also according to plan, Kurano-suke goes to Kyoto and becomes a drunkard and a wastrel. This is to allay the suspicions of both the shogun's spies and Kira's henchmen. He abandons his wife and children, who know nothing of his intent, but he takes his father-in-law into his confidence, and the latter sells his daughter to a brothel keeper to provide his son-in-law with funds for his project. In one of the motion pictures versions, the scene where the father sacrifices his daughter is said to have a tremendous appeal to Japanese audiences.

The ronins wait three years, until they are sure of success. Then they attack Kira's palace—aided by the fifth column they have planted within—kill his retainers, find Kira himself hiding under a pile of charcoal, speak to him respectfully as due his rank, offer him the honorable opportunity to commit suicide, kill him when he attempts to run, and then march in a body to Asano's grave, upon which they lay Kira's head.

During their march they are honored by noblemen and given homage by commoners. When the inevitable command comes from the shogun for them to kill themselves, each of the forty-seven, all of them already national heroes, is given over to a nobleman or a gentleman of high rank who is to supervise the ceremony. How each one dies is recounted at great length in every version of the tale.

That the story of the Forty-seven Ronins is based on historical fact is not so important as its tremendous and lasting appeal to the Japanese. It mirrors mass ideals.

Of late years a great deal of nonsense has been written about *Bushido*—the cult of the warrior—by ultra-nationalistic propagandists associated with the military faction during its struggle for political control of Japan; but it is a fact of the utmost importance and one that must never be forgotten by those who have dealings with the Japanese, that readiness to take human life, another's or one's own, has acquired a high place in the public imagination. It is an essential quality in a hero,<sup>4</sup> along with filial piety, loyalty to a superior, and deceptive cleverness in carrying out one's designs. These are the precepts of *Bushido*.

Naturally there was a resurgence of nativism at the time Japan was shut off from foreign contacts, and it motivated considerable

<sup>4</sup>One of the reasons why violence and the threat of violence have such potent force in Japanese politics is the public's assumption that assassination is, per se, a heroic act. For example, in 1889 one Nishino Buntaro stabbed Viscount Mori in protest against the adoption of the constitution of that year, in the belief that that document placed limitations on the divine authority of the Mikado. The public made Buntaro not only a hero but virtually a Shinto god, and they worship at his tomb to this day. See Chamberlain's *Things Japanese*.



historical research. This led to a revival or rather reformation of Shinto, which had become modified to a degree by the inclusion of various foreign elements, Buddhism, Confucianism, and Taoism—the Chinese demon-cult.

As Shinto is principally concerned with the adoration of the royal family, a question naturally arose in the minds of the purists as to whether the shoguns were not in fact usurpers, in spite of the customary ceremonial deference they gave to the reigning Mikado.

This led to a definite undercover movement to restore to the Mikados the actual exercise of the sovereignty that was unquestionably theirs. Naturally this movement did not progress very far in the shogun's own court, but it flourished in the imperial court at Kyoto, along with the revival of native Japanese art and poetry and the reformation of the Shinto cult.

Probably no one but a few scholars and some Shinto priests ever imagined that the actual reins of government would be given back to the Mikados, for after thirteen hundred years of political inaction the royal family and the court nobles had lost even the tradition of practical politics. But the powerful lords of Satsuma and Choshu, always resentful over the fact that the Tokugawas, provincial nobles like themselves, had seized the "access to the throne" as a hereditary right, quietly supported this "return the authority to the Mikado" movement and secretly gathered adherents among those lesser daimios who were not tied to the shogun by blood or patronage.

In the meantime the water near Japan's shores had become increasingly a highway for foreign ships. Occasionally one was wrecked on the Japanese coast and its crew promptly slaughtered. The Japanese justified these massacres on the ground that regardless of why or how a foreigner arrived on the sacred soil of Japan, he was an invader. This led directly to Commodore Perry's<sup>5</sup> entering Tokyo Bay with a battle fleet and practically at gun point forcing the shogun to sign a treaty guaranteeing humane treatment for castaways and giving Americans the privilege of residence and trade at several Japanese ports, including Yokohama.

Russia, England, and France immediately exacted similar treaties.

The shogun was powerless against foreign demands because his weapons and his military and naval organizations were of the sixteenth century and long rusty from disuse. But he was immediately

<sup>5</sup> See note 8, p. 31.

accused of treason and impiety for permitting the sacred land of the gods to be profaned by the defiling feet of foreigners. The Mikado's court at Kyoto, living a thousand years in the past, really believed that the foreigners could be driven out, in spite of the guns on their warships. The lords of Satsuma and Choshu, living on the seacoast and having adequate knowledge of the power and resources of the foreigners, knew better, but they fanned the agitation against the Tokugawas for their own ends.

Shogun Iemochi Tokugawa was trying desperately to do by diplomacy what he knew he could not do by force of arms—to get rid of the foreigners—when in 1863 the daimio of Choshu, acting with the secret approval of the Mikado's court, ordered his men to fire on the French, Dutch, and American ships riding at anchor in the port of Shimonoseki at the western entrance to the Inland Sea.

The powers concerned held the shogun responsible, sent a combined fleet against him, and extracted \$3,000,000 indemnity. Thus the Shogun Iemochi lost face entirely. He sent an army against Choshu. It was defeated and Iemochi died.

The Kyoto court then declared, in the name of the Mikado, that the shogunate was abolished. Iemochi's successor bowed to this edict, but many of his followers rebelled and had to be defeated in three battles by the Choshu-Satsuma-Kyoto coalition before order was restored in the land.

It is significant to note that the later phase of the Tokugawa resistance was an outright rebellion against the divine authority, with the rebels attempting to set up a republic,<sup>6</sup> a fact that all Japanese historians pointedly ignore. We should keep it well in mind as a forecast of what possibly may happen in the chaos following a military defeat.

While the Satsuma and Choshu partisans were still cleaning up the remnant of Tokugawa resisters, the unworldly literati at Kyoto set up a government modeled as closely as possible on what they imagined was that of the old warrior Mikados before the Chinese Buddhists appeared. They envisioned a complete return to the good old days not only by driving the Europeans and all they had brought with them out of the land, but by outlawing all the innovations that had appeared in Japan since 500 A.D., whether imported or developed locally.

It would have been interesting to see these visionaries attempt to

<sup>6</sup> See the section on History and Mythology in Chamberlain's *Things Japanese*.

force a nation of more than thirty million people back into a stage of culture where no one could count above ten, but this was not to be. Once the practical men of Choshu and Satsuma eliminated the last of the rebels, they promptly double-crossed the Kyoto dreamers, announcing that not only did they not intend to attempt to expel the foreigners then in Japan, but they were going to Europeanize the country as completely as possible and thereby make it strong among nations.

Buddhism was disestablished as the official religion as a sop to the court party. Otherwise the party's wishes were completely ignored. Both the national and provincial governments were modernized, together with the law and the judicial systems. The Mikado was put forth more prominently as the *de jure* supreme authority, but he was no more permitted to wield that authority than his ancestors had been. The actual exercise of his authority passed into the hands of a council that was dominated by the adherents of the Satsuma and Choshu lords in collaboration with the men of Tosa and Hizen who had been allied with them in the overthrow of the Tokugawas.

To understand the actual basis on which the Japanese central government was reinstituted, as opposed to the tentative form it had taken from time to time, it is necessary to explain the basic governmental system of provincial lordships—the “clan” council—which was fundamentally the same as the Mikado's government in the pre-Chinese period.

Strictly speaking, the use of the term “clan” in referring to the samurai followers of one of the provincial lords is incorrect because the warriors in each group were not necessarily kinsmen, but it is used because we have no more suitable word in English. Each “clan” was the body of samurai who were the men-at-arms to the lord of a daimiate and also functioned as gentlemen-attendants at his court and administrators of his estate. They were attached to their lord by sworn loyalty and filial devotion and their social relationship with one another was that of close association and mutual interest.

If the daimio suffered military or political disaster it meant death or degradation for the whole “clan,” for in either case his lands and the peasants thereon would be seized by or delivered over to a new lord, together with his own following of samurai. It was possible for a very strong lord to rule his “clan” arbitrarily, but this was unusual, for all precedent was against it. It was also possible for one

strong and unscrupulous samurai to arrogate to himself the regency, or even the actual title and estates of his lord, but the latter was an act of impious treason and the former was insulting to the other samurai of the daimiate, who were all jealous of their fraternal equality. The usual, almost universal custom was that all decisions of moment affecting the welfare of the daimiate were made by the senior members of its samurai, particularly those who had attained administrative positions on the estate. Though there always was great jealousy and distrust among them—where the daimiate was large there were usually several factions—so strong was their realization that they were all bound together by a common fate that compromise on a common course of action was inevitable. The daimiate whose council could not reach a decision and carry it out with the greatest vigor and persistence did not survive the long, bloody feudal period.

The "clan" council was an obvious outgrowth of the family council, which is the oldest and strongest political institution among all Mongolian peoples and is still the fundamental political unit in Japan. Like the lord and the Emperor, the family patriarch is in theory an autocrat, but it is always possible for vigorous and violent sons and younger brothers to force an aged or over-conservative head of the family into a course of action that is not to his liking, and at the same time give him abject obeisance. In so doing the Japanese have developed a genius for indirection, behind-the-scenes politics, and evasiveness, and an ability to reconcile mutual jealousies and reach compromise decisions in secret and act upon them so suddenly that the head of the family, or the daimio, or the Emperor is committed to their act in spite of himself.<sup>7</sup>

These methods of arriving at a political decision are the antithesis of democracy, which implies public discussion—decisions openly and noisily arrived at. But it is, to use the phrase so often employed by the Japanese themselves, "the Japanese way." It was begotten early in the history of the nation and it matured in the atmosphere

<sup>7</sup> According to several reports, not only did Emperor Hirohito not know of the long-planned attack on Pearl Harbor, but the day prior to the attack all the radios in the imperial palace mysteriously went out of order. The next day Tojo asked for an audience and humbly announced that the United States had declared war. Hirohito could only inform his divine ancestors of an accomplished fact.

Tojo, like any other Japanese, felt entirely justified in this course of action because it was what he and his council had decided was in his lord's best interest. If the Mikado had made public protest (an unheard-of procedure) Tojo and all his cabinet would have had to kill themselves.

of police-ridden suppression during the Tokugawa totalitarianism.

It is especially significant for our present study to understand that the fifteen great "family companies" which before the war owned or controlled at least three-fourths of all of Japan's productive capacity were in actuality governed "the Japanese way" regardless of their legal structure. In some cases the head of the owner-family was dominant, though always under the direct influence of a formal or informal council of his kinsmen and executive employees. In some cases no member of the owner-family had any power at all. The company was managed by a council of executive employees with one of their own number as the titular head of the concern; he had the same general relation to the head of the owner-family as the shogun formerly had to the Emperor.

The Tokugawas, as we have seen, were overthrown by a coalition of "outside" lords, those whom the Tokugawas had deprived of any possible participation in the all-potent "access to the throne" for over two centuries. Their act had the implied blessing of the revered royal family, long forbidden by custom from taking any part in politics by act or even implication, except as its opinion was reflected through the court party.

The Satsuma, Choshu, Tosa, and Hizen allies were beset by mutual jealousies and suspicions. No one of them was strong enough to seize the "access to the throne." Each knew that to attempt it would mean a destructive civil war which would end with Japan being divided into "spheres of influence" by the foreign powers. To assure a strong united Japan these men formed a council, a counterpart of the clan council they all knew so well, in which each faction had a voice. This council assumed the "access to the throne" and was responsible only to the Mikado, which meant in effect that they were responsible to themselves. In practice the men of Satsuma and Choshu could control this cabinet in face of the opposition of other factions. To strengthen this central authority further, all the daimios surrendered the considerable remnant of local autonomy that they had retained throughout the reign of the Tokugawas.

In 1880 a constitution based on that of Prussia was promulgated; it established a parliamentary system, with a House of Representatives that was elected by 2 per cent of the population that had the required property qualifications. This led to the formation of political parties and all the external trappings of nineteenth-century European parliamentary government. But neither the establishment

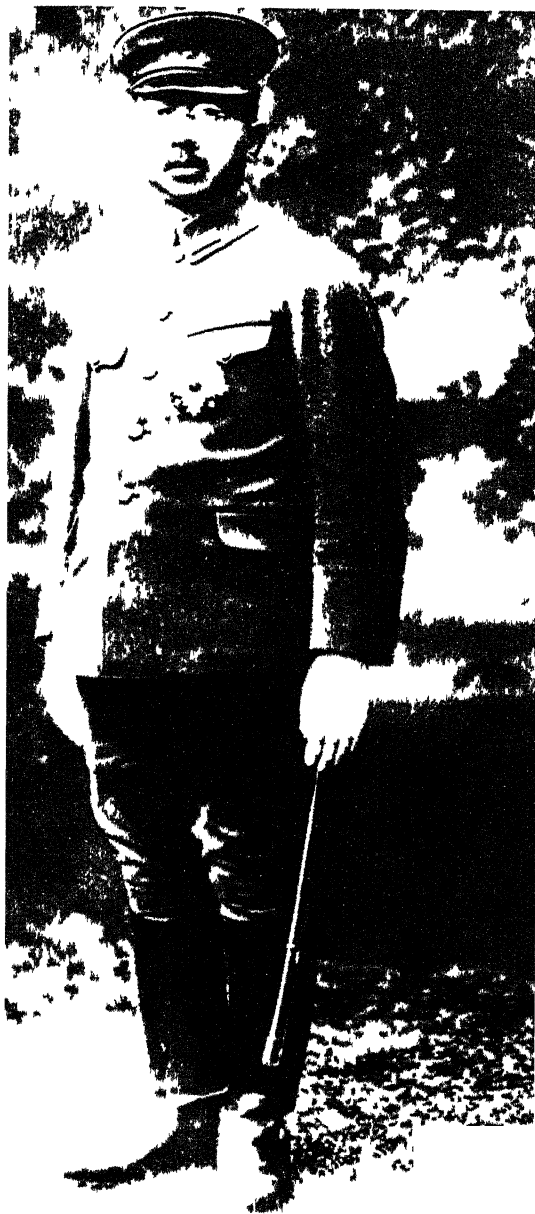
of the Diet nor the subsequent liberalization of the suffrage law made any fundamental change in the old system of determining national policy in the name of the Emperor by the clan-council method.

In the beginning the men of Satsuma arrogated to themselves the control and development of a modern navy and the men of Choshu took over the army. During the subsequent legal changes in the governmental setup they saw to it that the navy and war ministers were never responsible to the Diet but always to the Emperor, which meant in practice that they were responsible only to themselves. As these representatives of the two services could overthrow any cabinet by resigning, they maintained a complete check on any action of the government, on the other hand the government had no check on the activities of the army or navy other than by the roundabout and not always effective method of refusing them appropriations.

For many years the Sat-Cho (Satsuma-Choshu) alliance, through its control of the military services and its large representation in that powerful extra-legal group of councilors known as the *genro*, itself a glorified clan council, controlled the "access to the throne." The Sat-Cho gradually lost control of the government after the turn of the century because of the rising power of the great industrialists who, as a whole, backed the parliamentary party. In the meantime there grew up within the army and navy, particularly in the army, several cliques of officers with ultra-nationalistic and anti-capitalistic tendencies who gradually absorbed the control formerly exercised by the clansmen. They had their differences, but these they compromised among themselves by the time-tried method. In 1931, one of these factions, in command of the practically autonomous garrison on the Kwantung peninsula that the Japanese had seized from the Russians in 1904, set forth to conquer Manchuria. They thereby precipitated a chain of events that led to the attack on China and the complete domination of Japan's entire political and economic structure by the military, their alliance with Germany and Italy, and the attack on the United States and on the Dutch and British colonies.

**Characteristics of the Japanese People.** The Japanese, during their long history, evolved a strong, narrow, complex, and well-integrated native culture from the Chinese and from primitive, autochthonous elements. It was far too firmly rooted to be sup-





THE EMPEROR, HIROHITO

· sacred fountainhead of national authority is forbidden by custom from  
ng any active part in the government, as his ancestors have been for 1500  
ts. (*Acme* )





#### THE MILITARY

Army and navy leaders for years practically maintained independence of all civilian control and have dominated the national government since 1937 (The Pictorial Orient November, 1940)

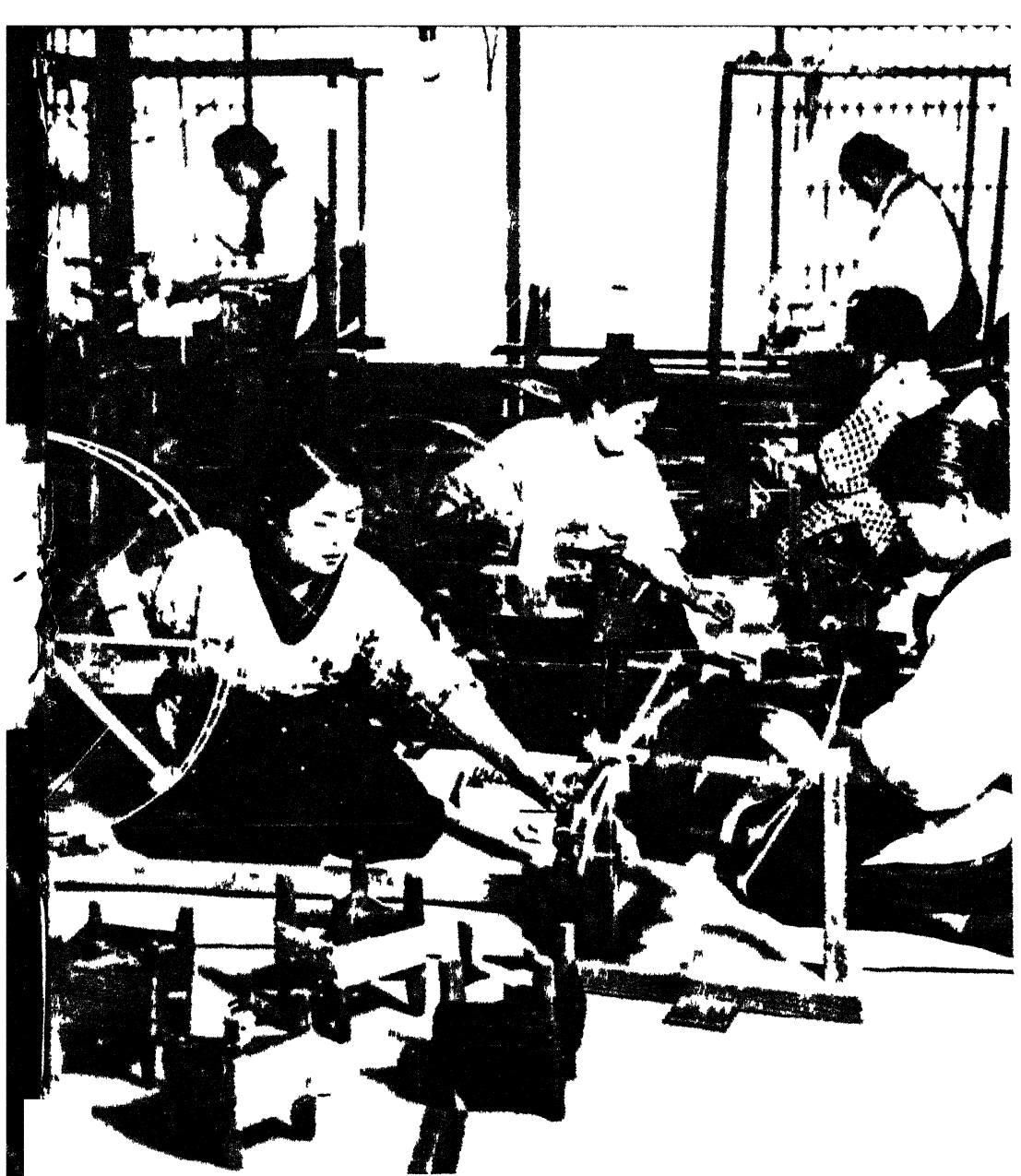


#### THE FINANCIER

This sad little man is Seimin Ikeda, formerly Finance Minister, governor of the Bank of Japan and managing director of the great Mitsui holding company. The financiers and the military both wanted to make Japan a world-dominating power but were in conflict over method. (*Wide World*)

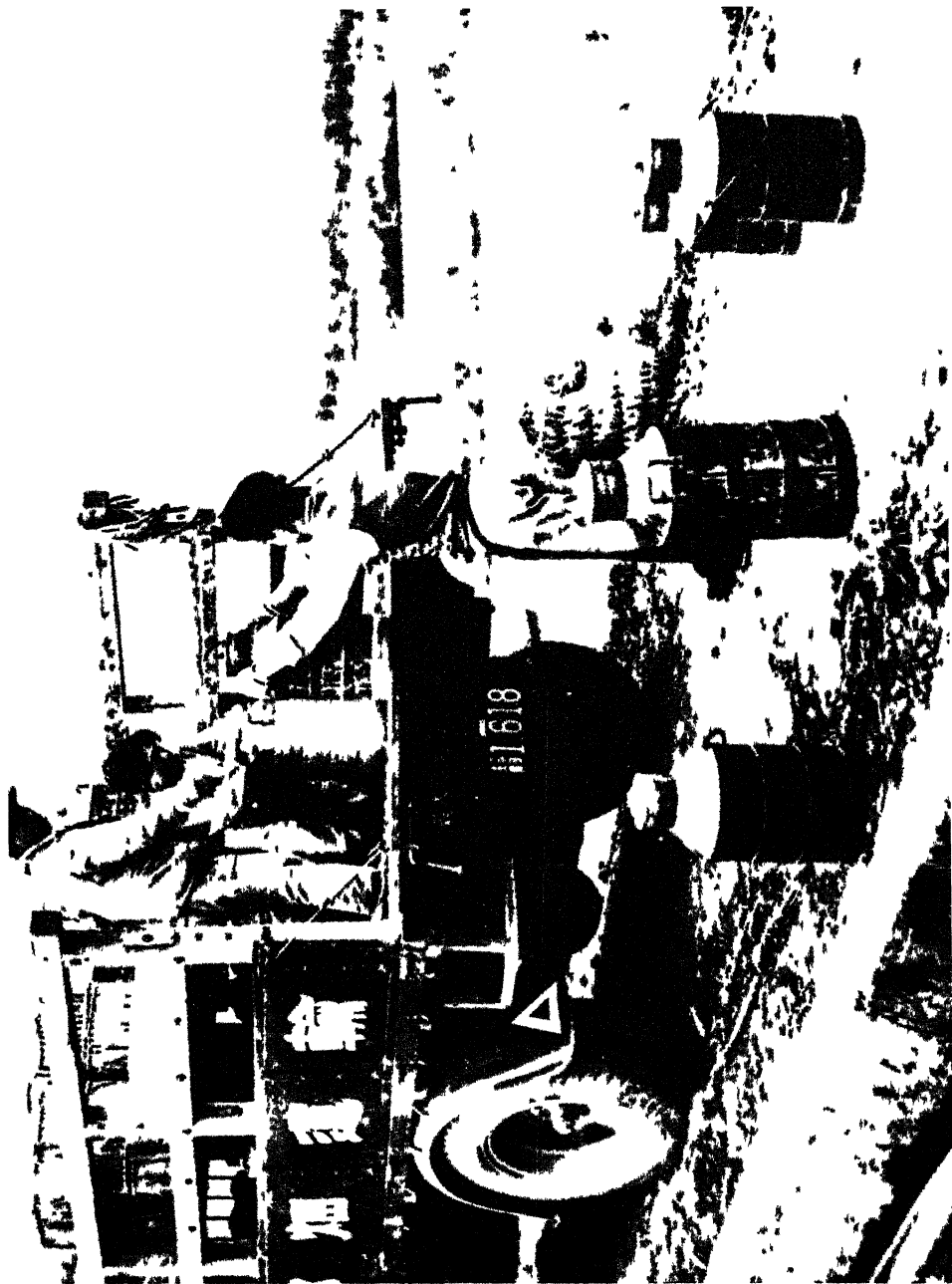


THE INDUSTRIALISTS  
Japan was committed to  
the financiers and then  
the industrialists, sup-  
pl the military. This group  
abacco trust executives  
to have the long thin  
characteristic of Japanese  
clacy. The girl worker  
broad flat face (Acme )

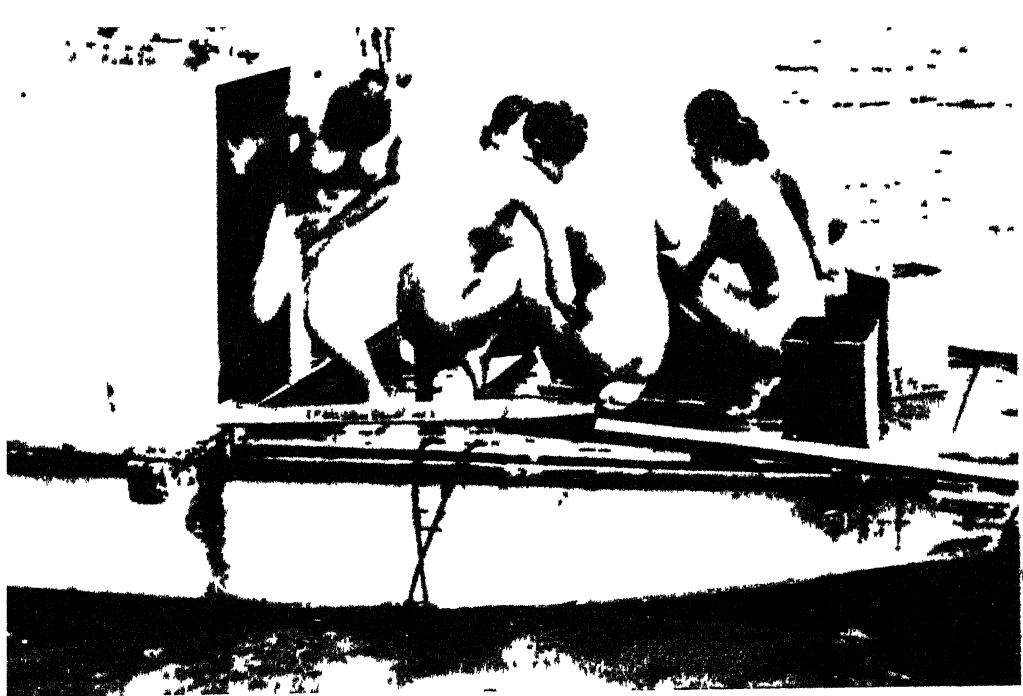


#### HANDICRAFTERS

These broad-faced peasant women are weaving silk in one of the thousands of home factories that still produce a large fraction of Japan's industrial output. Note the single electric light, characteristically the only modern convenience. (*Wide World*)



WORKING MEN  
ig charcoal and milk for  
kyo market. Three men  
two-man job—typical of  
(*Wide World*)



#### WORKING WOMEN

No job is too hard for a woman (Above) Divers on one of the Mikimoto "pearl farms" (*International News*) (Below) A female fire company with hand pump engine (*Wide World*)





FARMERS

The straw cape keeps the rain off the farmer's back, but his feet are never dry  
(*International News*)



FARMERS

The straw cape keeps the rain off the farmer's back, but his feet are never dry  
(*International News*)



planted or even fundamentally disturbed by the sudden impact of western civilization that struck Japan in the latter half of the past century. The Japanese have been able to adopt or adapt, or in some cases thoroughly assimilate, the external aspects of modern civilization that suited their own ends without altering certain characteristic thought processes, or what may be better described as thought patterns, and certain basic concepts that are the product of their whole racial development.

Of course the Japanese do not inherit thought patterns or concepts any more than other human beings do, but they begin to absorb them in their first conscious moments. By the time the Japanese child is old enough to enter primary school, where he will be thoroughly and deliberately indoctrinated in them, these concepts are already firmly implanted in his mind. While it cannot be said that all Japanese think entirely alike, they come closer to it than any other people who have attained an advanced civilization. There is a remarkable sameness of expression on all the faces in any Japanese crowd—a fact often noted by foreign residents in Japan—that can be paralleled only on the faces of a group of savages belonging to a single very closely integrated tribal group.

These basic Japanese concepts are six: Unity, compromise, indirection, patience, persistence, and ruthlessness.

*Unity.* Filial piety and devotion to the divine Emperor are very real in Japan, but they are only expressions of the Japanese devotion to unity. It must be remembered that the Japanese are small men who fought and continually defeated and dispossessed larger men for two thousand years because they, the Japanese, achieved unity and the larger men did not. The Mikado remained a continual and indestructible symbol of unity that no one had the temerity or even the desire to obliterate even in times of feudal anarchy.

The notion that the ruling family is directly descended from the gods in the eldest line is by no means unique. It is practically the universal rationalization of the origin of kingship, and was well developed in Egypt and Mesopotamia five thousand years ago. Only the Japanese, however, have clung to this cultural anachronism, a symbol of the unity that has continued to bring them victories over larger, stronger men.

There is another aspect of Japanese emperor worship. In a land where the earth trembles, where volcanoes suddenly burst forth and bury whole villages, and where at any time during nine months of

the year a typhoon may blow the roof off a man's house, a profound fear of the forces of nature is likely to lead to their worship. The Emperor of Japan is the ranking descendant of these contending forces and the only living being who can mediate with them.

The Japanese have more intimate illustrations of the value of unity in their daily lives. In a land where the growth of population has long crowded hard on the heels of the total production capacity, the struggle for survival, or at least the effort to maintain one's position in the social order, is very keen. The family, the clan, or the business firm that did not present a united front to all its rivals quickly lost out in the struggle.

*Compromise.* Unity under a divine or, in the case of father or lord, at least a worshipful and revered leader is the Japanese ideal, but in practice the Japanese have always been governed largely by self-chosen top-faction groups—family council, clan council, imperial council—that exercised authority in the leader's name, though often without his cooperation and sometimes without his knowledge or consent. The reason, of course, is that the titular ruler, normally the eldest male in the sole or senior family in the group, has in many cases proved incapable of exercising his own authority.

Thus executive decisions—in business, in war, or in the imperial government—must be reached through compromise arrived at by intricate undercover politics circumscribed by a most elaborate code of courtesy and a genius for secrecy and indirection. This is a time-consuming process and a source of weakness as well as strength.

*Indirection.* When well-established practice conflicts with dearly held theory, indirection and subterfuge become necessities. Saying exactly what they mean and doing exactly what they say are not the common practices of the Japanese. They cherish the oblique approach, and their language seems to be especially designed to make equivocal insinuations and avoid direct statements.

*Patience.* Patience is a corollary to successful compromise by the devious Japanese method. Patience is bred, too, by living continually in closely packed groups where the individual must so often await group action or defer to the wishes of elders and superiors. The patience of the Japanese is all the more remarkable in view of the fact that they, unlike the Chinese, have pronounced neurotic tendencies and are inclined to hysteria.

*Persistence.* Persistence is patience's twin. As workers the Japanese succeed by patience and persistence rather than by vigor and

strength. European employers have found Japanese laborers willing to work doggedly twelve hours a day, but they cannot or will not stand up under eight or even six hours' work at the speed that is usual in America.

*Ruthlessness.* Ruthlessness is such an integral part of their character that the Japanese are hardly aware of it. Certainly the Japanese militant nationalists saw no occasion to urge and eulogize this trait as did the neo-pagan Germans. Japanese ruthlessness in carrying out a plan, once it has been agreed upon and given official sanction, can be duplicated only by that of a colony of foraging ants. It is not necessary to give any detailed examples of it to a generation that has seen the Japanese army in action. In commerce and industry the Japanese have demonstrated the same qualities and substantially the same procedure as in war, though by and large they have been less obvious, because men who have been trained for important posts in trade, with their broader contacts and much more liberal education, are more subtle than military leaders.

The Japanese are eager to take-advantage of any lack of ruthlessness on the part of others but they despise them for that lack. While they were often enraged at such mid-nineteenth-century realists as Sir Harry Parkes<sup>8</sup> and Commodore Perry<sup>8</sup> for frustrating their designs, they greatly admired both men and secretly and sometimes even openly disparaged the sentimental collaborationists and appeasers who conducted English and American affairs in Japan during subsequent periods.

On the negative side the Japanese have learned to place such reliance on group action and group initiative that they neglect the development of individual initiative. It is lacking even among the leaders, because in practice the exercise of authority is habitually in the hands of a top-faction group rather than an individual leader. The Japanese plan well but slowly, and they must have a plan to follow. If that plan fails, they may have another to fall back on. If that fails, the leader resigns or commits suicide, and a new group is

<sup>8</sup> Commodore Perry not only opened Japanese ports to the world, but he had realistic views about the Japanese which should be carefully studied. See his *Narrative*, a "must" for every serious student of this area.

Sir Harry Parkes, another realist, was the British Minister to Japan from 1865 to 1883. He was cordially hated by the Japanese, but they freely acknowledged that he was the one European they could never deceive. See *Life of Sir Harry Parkes* by S. Lane-Poole and F. V. Dickens.

Such tough-minded, clear-sighted men as these, and not the sentimentalists who later decried them, will be needed as occupational administrators.

formed which evolves another plan by age-old methods of recondite compromise. Swift decisions by one man with both authority and responsibility is not "the Japanese way."

For this reason the Japanese have been more successful than any other oriental people in large, well-coordinated commercial and industrial establishments; but as individual merchants, or as entrepreneurs operating without government or corporation backing, they have never been able to compete with the Chinese, or even with certain East Indians.

How the Japanese will react in defeat we do not know. Except for a few temporary incursions into Korea in the Middle Ages they had had no experience in foreign wars until they attacked China in 1895; their success during the next forty-six years confirmed their belief in their divine destiny as conquerors. This conviction is closely bound up with their belief in the divinity of the Mikado and its corollary, the perfectibility of the Japanese race.<sup>9</sup> The shock of disillusion may have a profound but probably temporary effect on the nation's capacity and prolong the period of reconstruction some years.

<sup>9</sup> This Japanese belief rests on two premises.

1. That they are god-born. The Mikado is descended from god by the especially sacred eldest line. All other Japanese are heaven-descended through lesser collateral lines that diminish in sanctity the farther they are from kinship to the royal family. All are infinitely superior to earth-born foreigners.

2. That all Japanese acquire sanctity because they automatically believe in the divinity of the Mikado and acknowledge him as the *de jure* ruler of the universe.

These are the reasons that have been seriously advanced by Japanese scholars for the fact that the Shinto religion has no moral code. Moral codes are necessary only to earth-born foreigners who are steeped in sin because they refuse to acknowledge the Mikado's divinity. The scholars give no explanation of the fact that the Japanese have for centuries been the world's most police-ridden race.

### III.

## Agriculture

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*In spite of the unprecedented progress of manufacturing in the past sixty years, agriculture remains Japan's leading industry in respect to both invested capital and net output. It supplies about 95 per cent of the food requirements of the nation and still constituted an important element in foreign trade at the beginning of the Second World War. However, it has suffered from progressive debility for many years as a result of several political, economic, and social factors, among which the following are the most significant: (1) An enormous burden of taxation; (2) a huge and continually increasing debt burden; (3) the decline in soil fertility; (4) the rapid increase in the rural population; (5) the deterioration of sources of subsidiary income.*

**Taxation.** Traditionally a tax on land has been the principal support of the Japanese government, both local and national. As some 90 per cent of the nation's income was derived from the products of the land prior to the very recent industrial revolution, this was understandable. But partly from habit and partly from the desire of the government to promote the growth of industry and commerce at all costs, the taxes on land and on the products of agriculture have been increased both actually and proportionately. Furthermore, the enormous and mounting cost of building and maintaining a modern war machine had to be paid by taxation, at least to the extent to which it was paid. Finally, some form of tax remission was among the subsidies Japan has always granted favored industries, those essential to her program of expansion.

The result is, according to a statement published by the Imperial Agricultural Society not long before the beginning of the war, that landlords pay 50 per cent of their annual income in taxes and peasant proprietors 31, as against the 14 per cent paid by merchants and the 18 per cent paid by manufacturers. Agriculture has been paying the subsidies given to commerce and industry.

**The Debt Burden.** The total mortgage indebtedness of Japan's

farms rose from \$375,000,000 in 1914—about \$65 per farm family—to \$1,700,000,000 in 1937, or about \$300 per household. This is the private debt of the farmer; it does not include his share of the village debt or his share of the debts of the prefecture and the nation, all of which are appalling. Since the average tillable land per farm family is only slightly in excess of two acres and is steadily decreasing, while the tax and debt burdens and the fertilizer costs are increasing, the debt structure borne by the Japanese farm can be

## JAPAN'S FARM DEBT

**1914 \$375,000,000**



**1937**

**\$1,700,000,000**



described only as fantastic. Still more fantastic is the rate of interest the farmer must pay on this mounting debt. On more than half of it the interest rate exceeds 20 per cent. Over two-fifths of the farm income is paid out in interest.

This rate is four or five times as high as that on government-sponsored loans to favored industrialists and is even more preposterous in view of the 1½ per cent paid on loans to shipbuilders. Again, agriculture has paid, in part at least, the subsidies granted to preferred types of industry.

**Decline in Soil Fertility.** The decline in the natural fertility of the Japanese farm land has been due in part to the leaching effect of the heavy rainfalls, but to a greater extent to the continual production of soil-depleting small grain, principally rice, barley, and wheat. In the southern part of Shikoku and a few districts in Kyushu the climate is so warm that two crops of rice are grown on the same field each year. Over a large part of Japan's Pacific slope barley is sown in the fields immediately after the rice harvest. The barley

ripens in the early summer before the rice shoots have to be transplanted from the seedbeds to the main field. Elsewhere winter wheat takes the place of barley as a second crop.

This practice would have worn out these fields long ago but for the fact that the Japanese have been extensive users of natural fertilizer for centuries. Soil depletion progressed, however, and the yield per acre decreased seriously in many districts until recently, when the use of chemical fertilizers was introduced. Since then the crop yield has been maintained and increased, but at the price of decreasing the cash yield to the farmer, for the cost of imported fertilizer has become a major item in his operating expenses.

**Rural Overpopulation.** The Japanese are notoriously fecund and, as elsewhere, the greatest increase in population occurs in the rural districts. Until the end of the sixteenth century famines, pestilence, and local and national civil wars were substantial checks, but the population grew despite them. The excess of population was able to find new land, either by cutting down forests, draining swamps, and terracing mountainsides, or by slowly pushing back the Ainus, who still held part of northern Honshu. By the time the autocratic Tokugawas assumed control of the national government the Ainus had been pushed back to Hokkaido. Feudal wars came to an end, and the improvement in transportation resulting from the development of national highways and the beginning of an extensive system of canals greatly decreased the number of periodic local famines. That left pestilence as the only major check on population increase and this was largely removed by the adoption of modern medical procedure after 1870.

At the end of the Tokugawa regime the national government began a campaign to exploit and later to colonize Hokkaido, which hitherto had been largely left to the Ainus. This campaign was furthered under Emperor Meiji. Hokkaido is too cold and dry for the traditional Japanese small-field rice culture and the peasants showed great reluctance to migrate and take up life under unusual conditions. Today Hokkaido, the second largest Japanese island, has only about 3,000,000 people.

The rural Japanese have shown a similar reluctance to migrate to Manchuria and Korea, where the climate is severe, and migration to such favored localities as California and Hawaii was soon proscribed by American law. Outside of the armed forces and the civil officials in occupied territories there are probably fewer than a

million Japanese living abroad today, less than the natural increase for a single pre-war year.

As the natural increase in the larger industrial centers is itself considerable, the cities have been able to absorb only a part of the rural increase, in spite of their phenomenal growth since the beginning of the century. Furthermore, a great part of the excess of population that has left the rural districts has been seasonal or boom-time laborers, girls indentured to textile mills or other factories, or boys conscripted into the army. The majority of all of them return to the land.

The result is that individual holdings have been subdivided to the point where many will no longer support a family even at a minimum subsistence level. The farmer then must either find additional employment, which has become increasingly difficult in most districts, rent additional land, or sell his holding and become an outright tenant or a common laborer.

When Japan began her full-scale war on China in 1937, there were something over five million farm households in Japan. Seven out of ten of these families owned insufficient land for their support or else no land at all. More than half of those who did own land had less than an acre and a quarter. On the other hand some 200,000 families, a little more than 3½ per cent of the whole, owned nearly a quarter of the farm land.

In all, about one-half of the 16,000,000 acres of tillable land in Japan proper is farmed by tenants.

Although Japanese agriculture is by all standards a bankrupt industry and its yield per man-hour of labor among the world's lowest, the total gross yield and the per-acre yield have been consistently high, partly because the Japanese farmer and his large family are conditioned to hard work and privation by long habit and fanatical nationalism.

The policy of the government has been to keep the country as nearly as possible self-sufficient in the production of foodstuffs, no matter what the cost to the farmer. Persistent propaganda has taught him to blame his hard lot on the semi-Europeanized city capitalists and the foreign powers and their economic and political "encirclement" of Japan. This policy has been largely successful. Japan has maintained self-sufficiency in all major food crops except rice.

In 1931, the year of the conquest of Manchuria, the imperial government began experimenting with a variety of measures, all of



them having the stated purpose of alleviating the sad condition of the farmer but actually designed to maintain this agricultural self-sufficiency. For instance, the five-year plan for wheat inaugurated in 1932 did triple the farmer's income from wheat, but it also accomplished its real purpose of raising production to fifty million bushels by the 1937-38 harvest. This was done principally at the consumer's expense by raising the tariff on all imported wheat and flour, although superior varieties of wheat and improved cultural methods were introduced. To a considerable extent wheat replaced millet and barley as a second crop in rice fields and to a lesser extent mulberry trees that were cut down because of the continuing decrease in silkworm culture.

Earlier, in 1926, the government appropriated \$150,000,000 for a twenty-five-year program to permit tenants to buy rented land. In 1932, in line with the general agricultural program, a huge increase in this appropriation was planned, but it was blocked by the landlord interests. By 1936 about 120,000 tenants had bought 130,000 acres of land, a little more than an acre each. According to the last figures issued, only about 2 per cent of the tenants have received any advantage at all from the purchasing program, so its over-all effect has been negligible.

The government also instituted extremely inclusive price controls of selected crops, with the announced purpose, as stated in the preamble to the Rice Law of 1933, of "maintaining agricultural prices at levels that would satisfy the needs of the producers without sacrificing those of the consumers." This sort of juggling failed just as it had many times before. Under this act the maximum and minimum prices were set each year for the entire empire and maintained by a million-yen stabilization fund. The growers reaped considerable benefit, but the fund ran out and, confronted with the prospect of losing money, the government amended the law in 1936 to institute a warehousing procedure that threw the burden back on the farmer. The result was that in 1936 the farm income from rice was \$300,000,000 less than in the pre-price control year of 1929, although the rice was sold at a higher price and the crop was one-eighth larger!

As the use of chemical fertilizers became increasingly necessary to maintain crop production, their prices went up. Here the government instituted a system of bulk purchase as well as price control to check skyrocketing costs. Whether or not this would have been

effective cannot be determined, for the Chinese war and the general war that followed soon placed nearly all chemical fertilizers in the category of munitions.

**Deterioration of Subsidiary Industries.** Two important subsidiary industries that have been a source of additional income to the Japanese farmer have deteriorated in the past few years.

The first is silk culture. Although many families have been entirely dependent upon silkworm raising, it is a between-crop occupation in many districts. The development and improvement of rayon and other synthetics caused a continual decline in cocoon prices in spite of government subsidies; in 1934 the farm income from this source was only 20 per cent of what it had been in 1929. It rallied to 35 per cent in 1936, but in that year Japan rose to first place in the world's production of rayon, and shortly thereafter a series of new synthetics, including the now famous nylon, were developed in the United States. Whether natural silk, in a free post-war economy, will be more than a luxury commodity with limited use or whether it will assume something like its pre-war importance is a matter of conjecture.

The second is charcoal, universally used in the primitive clay fireboxes that serve as cook stoves in the vast majority of Japanese kitchens. As most rural villages are but a short distance from at least one tree-covered mountain, charcoal burning has always been a between-crop occupation for farm families. Abundant precipitation makes reforestation rapid in Japan, but on the average it takes about three years for a tree to grow to a size and state of maturity where it is worth cutting for charcoal. In the past this allowed continuous cropping of the public forests available to the peasants. Within the past twenty years the demand for charcoal has grown; as a result, the rural families, having less land and less farm income, have turned to charcoal burning so intensively that they have cut the trees faster than they grow. Consequently the people are now reduced to the uneconomic practice of burning of year-old saplings, and the income per labor unit has been reduced to a small fraction of what it was formerly.

Other sources of outside income for the peasants have been the sale of the services of their children, particularly their daughters, on labor contracts to various industries and institutions in the cities, and allotments from the pay of their sons, miserable as it is, in the army. The subject of the girls contracted to the textile mills will be

dealt with later, but the unusual relationship between the peasants and the military forces, particularly the army, will be discussed here because it has a direct bearing on Japan's agricultural situation.

The peasant boy has always been the preferred conscript since the beginning of the modern Japanese army. He is sturdy, for only sturdy children can survive on a Japanese farm. He is conditioned to long hours of monotonous toil, a meager diet, extremes of heat and cold, and, above all, rain and wind. His lot is so hard at home that he looks forward to army service, glowingly described by returned conscripts, with pleasant anticipation. More important, as a Japanese officer put it, "he does not know too much." That is, he has had only the minimum primary education required by law and no contact at all with occidental ideologies.

The army itself undertook to give the conscripts that showed any capacity for leadership or technical work a thorough training. The way to promotion to non-commissioned and commissioned rank—there is little or no social gap between the two in the Japanese army—was wide open for the peasant-conscripts. Their zeal was tremendous, for the lucky ones could stay in the army as professional soldiers, a lot infinitely preferable to returning to the mud of the parental rice paddy.

When the army was first modernized in the early days of the Meiji regime, it was controlled by chosen partisans of samurai rank and instructed by foreign officers, German and French, and then by Japanese officers educated abroad or by foreign instructors in Japan. Among these officers there was always a faction of militant nationalists eager to accept all the strictly technical foreign knowledge but no foreign ideology that would weaken the fundamental concept that the God-Emperor was the *de jure* ruler of the world and that the Japanese were divinely appointed to enforce this rule.

This faction grew progressively larger as more and more farm boys, educated by the army for the army, rose to commissioned rank. After the Russo-Japanese War it became dominant in the Kwantung army, the Japanese army of occupation in the former Russian leasehold in southern Manchuria, which acquired practical autonomy by maintaining that its command was answerable to the Mikado alone. After the Kwantung army seized Manchuria, largely on its own initiative, this "younger officer" faction became an increasingly powerful force in the Japanese home army and in national affairs, mainly by assassination and intimidation.

While these sons of farmers subscribed to several versions of state socialism—each of several cliques had its own—and maintained that all the means of production should be the personal property of the Emperor, they have never instigated any substantial program to improve the economic condition of the agriculturists. They deplored rural poverty where it became so extreme as to limit the physical effectiveness of future conscripts through inadequate diet. Otherwise their policy was to glorify it. They were firm in the belief that poverty produced the best soldiers and that the overburden of taxes on the land was essential to support an expanding army. The army in turn would be a great benefit to the farmers in two ways: immediately, because it assured promotion to more and more farmers' sons and consequent increases in pay allotments to their fathers; and ultimately, because the territories conquered by the army would bring a golden era of prosperity to all Japan.

Through their sons Japanese agriculturists on the whole felt that they had a vested interest in imperial expansion. They accepted the inequalities thrust upon them because of their belief, strengthened by the military successes of 1931 to 1942, that their all-conquering sons would bring an end to such disparities.

Because they have lived so long on husks and hope, the defeat that puts an end to that hope will be more profoundly depressing to the farmers than to any other class in Japan. They will react in one of two ways, either by hysterical violence or by a numb, paralyzing confusion in which they will wait for death. Both are typical of primitive Japanese and both will be equally disastrous to agricultural production, which must continue in full swing if the population is to be fed.

It is of the utmost importance that the army of occupation forestall this disaster immediately by giving the farmer new hope in place of the old one. One of the first acts should be the broadcasting of a clear and simple statement that his debt burden will be promptly removed and his tax load reduced to a minimum, and that for the first time in his life his income will belong to him. Given this incentive the farmer will take care of the problem of food production.

#### AGRICULTURAL COMMODITIES

**Rice.** Rice is the principal crop on about half of Japan's 16,000,000 acres of tillable land, and the half devoted to this crop is by far the

more valuable and productive. The annual yield varies considerably but averages close to 20 billion pounds or 350 million bushels. This is seven times the average annual production of rice in the United States and is exceeded only by that in China and India.

The Japanese prefer rice to any other cereal, and home-grown rice to any imported variety. But the domestic crop is always from 5 to 15 per cent short of supplying the domestic demand, in spite of the fact that a considerable number of Japanese, including a large part of the rice-producing farmers, cannot afford to eat rice. These people live on cheaper cereals, such as barley, millet, and wheat. As one Japanese writer puts it, "In the country only the very fortunate and the very ill eat rice." The peasant grins with pleasure when his daughter is indentured to a factory or his son is conscripted by the army. "They'll eat rice every day!" When he hears that one of the village elders is being fed rice he is horrified. "What! They're feeding him rice already? I had no idea he was that far gone!"

The Japanese have names for, and native experts claim they can distinguish, 3000 varieties of rice, though botanists distinguish only a couple of dozen. The reason for the discrepancy is that rice is so overwhelmingly important to the Japanese that they can recognize the slightest variation in color, form, hardness, taste, and so on, due to small local differences in soil, climate, and cultural methods.

There are two major methods of cultivation, the upland and the lowland. Upland rice grows in the field where it is sown; it is not transplanted and the field is not flooded. The procedure is the same as that used in growing a field of wheat and involves comparatively little labor, but upland rice is generally inferior.

The lowland method produces a far greater yield per acre, but at an infinitely greater cost in hours of labor. Since land is comparatively scarce and labor is incalculably cheap, the lowland method is used wherever the rice field can be flooded and so produce all but a small portion of the total crop.

Cultivation by the lowland method varies in details from district to district, but the common element is backbreaking toil by the whole farm family.

With from one to three acres of land, the average farmer has no work animals, and of course no cultivating machinery. His tiny fields have already been leveled and diked or terraced by his ancestors; hence he has no primary development to do unless his district has been visited by a flood or an earth-cracking quake. His biggest

job is preparing the field. If it has the preferred clay subsoil, the top soil is entirely removed and the subsoil is tamped or pounded to create an artificial hardpan or plow sole that is practically impervious to water.

This process not only saves water but prevents the expensive commercial fertilizer from penetrating below root level. Fertilizer is evenly mixed with the soil, and the latter, carefully rubbed between the fingers of the entire squatting family, is spread back over the field. This is usually not done every year in every field, but it is done often enough to add tremendously to the family's annual hours of labor.

In the meantime young rice plants have been growing in a small seedbed. The beds are sowed about the first of May (this varies according to climate) and early in June the seedlings are transplanted into the main field. It has already been flooded and mulched with straw and manure, the mulch being tramped into the mud by the farm family; the rice seedlings are planted by hand in neat rows. The Japanese maintain that the act of transplanting has a stimulating effect on the seedlings that results in about a one-quarter increase in yield.

The field is kept flooded and is continually tended all during the growing season. The family spend almost all the daylight hours knee-deep in mud and water, pulling water-grown weeds, applying a few crystals of commercial fertilizer to the roots of each plant, and, where irrigation by gravity flow is not possible, maintaining a constant water level in the field with an ancient treadmill pump.

Rice blooms in early September; by the first of October the field is allowed to dry and the rice ripens. Reaping and threshing are hand operations that have not changed in a thousand years.

While the acre yield obtained with this method is high by oriental standards, the over-all average for Japan is lower than that in California—the ratio being 47 to 51—where rice is sowed in large fields in the same manner as any other small grain, without transplanting. The fields are flooded during the growing season and dried off while the grain is ripening. The rice is reaped and threshed by power machines; hence the expenditure of man-hours per unit of grain is infinitely less than in Japan. The principal reason for the larger yield is the selection of land. In Japan every acre that can possibly grow rice is sowed to it. In California rice is grown only on

land that has great natural advantages for producing it by our methods.

Japan's rice crop may be temporarily reduced in the immediate future because of the soil depletion that has resulted from the lack of commercial fertilizers during the war. There is not likely to be any substantial increase in rice acreage, for almost all the land in any way suitable has long since been utilized. Whether there will be a decrease depends on two factors, a possible change in the nation's dietary habits or the development of more profitable uses for the land, or both.

By and large, the problems of land utilization should be worked out by the Japanese themselves with a minimum of supervision. They have long-established organizations and techniques for agricultural research and experimentation that have been very successful in meeting practical problems.

**Barley.** Barley, with an average yield of over 150 million bushels for the recent pre-war years, is Japan's second grain crop. About half of it is grown in rice fields as a winter crop. A high yield per acre is indicated by the fact that in the United States the barley acreage is nine times that of Japan, whereas the total yield is only three times as great.

Barley has become increasingly important as the food of the poor, and the large and expanding brewing industry is an important outlet. Beer has been rapidly replacing the more expensive *sake* (made from rice) as Japan's national drink. Barley production will probably increase.

The soil depletion resulting from growing two small-grain crops on the same land in the same year is in some measure compensated by the Japanese practice of returning every bit of available straw and chaff to the soil as mulch.

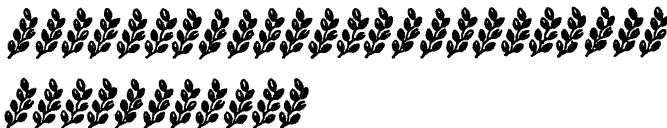
**Wheat.** The 50-million-bushel crop produced during the winter growing season of 1937-38 made wheat Japan's third grain crop. About half was grown as a second crop on rice fields. The quality is dubious, but the Japanese have small regard for wheat as compared to rice. Furthermore, the government's wheat program emphasized high yield at the expense of quality, and seed varieties were selected accordingly.

Wheat production in the United States is twenty times that of Japan, Canada's is twelve times, France's six, Argentina's five, and

# AGRICULTURAL COMMODITIES

EACH SYMBOL EQUALS 10,000,000 BUSHELS

RICE



BARLEY



WHEAT\*



OATS



WHITE  
POTATOES



SWEET  
POTATOES



SOY BEANS



\* 1937-38 GROWING SEASON

EACH SYMBOL EQUALS 10,000,000 POUNDS

TOBACCO



TEA



EACH SYMBOL EQUALS 200,000 YEN

VALUE OF

CANNED VEGETABLES



VALUE OF

CANNED FRUIT





Australia's three. Japan's acre yield equals that of France and is roughly twice that of the other four countries.

Any considerable increase in Japan's wheat output will be conditioned by two circumstances, namely, a profound change in dietary practice and extension of cultivation to the island of Hokkaido, where either hard winter or hard spring wheat will flourish.

**Rye.** Twenty years ago rye was an important off-season crop grown in rice fields; its total annual yield was almost as large as that of barley and exceeded that of wheat. For reasons not specified in any available Japanese publications, the yield began to decrease sharply and plantings fell off. No figures were published in the 1938 issue of the *Foreign Commerce Yearbook*<sup>1</sup> on Japan's production of rye. This decline was probably due to the rye blight which became prevalent about 1930.

**Oats.** Japan produces about 10 million bushels of oats annually. This grain is not locally favored as human food. The army-sponsored horse-breeding industry has been the largest cash market for it, but a considerable amount of oats and oat hay is fed to cattle on Hokkaido, where 95 per cent of the oats is grown.

**Millet.** Fifty years ago millet was the principal food of the poor. Its production has been largely superseded by that of barley and wheat.

**Other Field Crops: Potatoes.** About 60 million bushels of white potatoes was the average crop in recent pre-war years. The average acre yield is very high—some 200 bushels. The acreage sown to potatoes was greatly increased during the war to produce industrial alcohol for the manufacture of explosives. This crop will play a large part in solving Japan's immediate post-war food problems.

**Sweet Potatoes.** The pre-war production of sweet potatoes was almost 150 million bushels and the yield was also high—about 200 bushels per acre. As early as 1938 Japanese publications mentioned a large but unspecified increase in production, principally for alcohol.

**Soybeans.** The average annual crop of soybeans was about 15 million bushels just prior to the war. These beans were an important food source because they supply protein to the always protein-deficient diet. Bean curd is the Japanese equivalent of cheese, and soy sauce is a universal condiment in Japan and throughout most of the Orient. The bean is processed for oil, from which a type of

<sup>1</sup> U. S. Bureau of Foreign and Domestic Commerce.

margarine is made, and is also used as a cooking fat. Bean cake, the residue from the oil press, is used as food for livestock and as fertilizer in the rice fields.

However, soybeans and all derivative products became a principal item of import from Manchuria and north China after those districts came under Japanese control, and domestic production fell off by half.

Large quantities of other edible beans are produced. The total production is impossible to calculate because of conflicting reports and duplicate names for varieties, but it exceeded that of soybeans in 1938. A vigorous upward trend is indicated.

**Tobacco.** In 1939, the last year for which figures are available, Japan placed sixth in tobacco production. The production and processing of tobacco has been a government monopoly since 1898. The industry is carefully nursed as a source of revenue. In the last years before the war between eighty and one hundred thousand acres were permitted to be planted to this crop and the annual production averaged about 150 million pounds, a very high acre yield.

Tobacco is a crop that requires intensive cultivation and a great deal of hand labor and is therefore particularly suited to conditions in Japan. The seed must be sown in a specially prepared bed, the seedlings carefully transplanted, and the field meticulously tended and fertilized throughout the growing season. Picking, sorting, grading, and curing the leaf require considerable skill and extremely tedious labor. Both flue-cure and air-cure methods are used.

Other factors favoring the cultivation of tobacco are the hot, humid summers and the variations in soil and climatic factors between the different tobacco-producing areas—variations that always exist in a mountainous, seagirt country where neither the soil nor the climate in one small valley seems to be quite the same as in the next. One of the commonest sentences the foreign investigator hears in Japan is, "Over the mountain the crops are different." Hence the taste, texture, and other qualities of tobacco grown in each local district are distinctive and this makes possible an infinite number of blends of native-grown tobacco.

Tobacco was introduced into Japan by the Portuguese late in the sixteenth century; the first recorded planting was made in 1605. The official reaction to smoking was hostile at first. In 1651 smoking was officially permitted, but only indoors. A hundred years later,

however, nearly every man and woman in Japan, and most of the children, smoked, indoors and out.

Some of the older and more conservative Japanese still cling to the tiny "three whiffs" pipe, with its long stem and very small metal bowl, but cigarette smoking has been almost universal since about 1890. A wave of anti-cigarette agitation, due in part to American missionaries and in part to the fear held by various nationalistic groups that the Japanese race was deteriorating physically, led to a law being passed in 1900 prohibiting children under twenty from smoking. However, the enforcement of this law, especially as applied to children beyond the school age, was greatly curtailed by custom and by the fact that the government itself soon began promoting the sale of cigarettes as a revenue measure.

In 1902 various strains of American white burley and yellow leaf were introduced and a long-range program was inaugurated to dominate the whole domestic cigarette market and capture as much of the world market as possible. With these objects in view two principal types of cigarettes were developed, the *Kuchizuki*, filled with "native" tobacco and with a mouthpiece attached—copied after the European cigarettes that were first introduced into Japan—and the *Ryogiri* "American"-style cigarettes, without the mouthpiece and filled with various blends of the new native-grown American varieties. American-type cigarettes grew in popularity until by 1939 they led in production by three to one. Five billion cigarettes were consumed in Japan that year.

By 1927 Japan attempted to cut off the importation of tobacco entirely by imposing a 200 per cent luxury tax on all but leaf tobacco. Imports of cigarettes and tobacco in other forms continued to satisfy the foreigners and the wealthy Japanese in the large cities who had been accustomed to them, but they fell off continually until in 1939 the Japanese reports triumphantly described them as a "mere trickle." Domestic consumption, valued at 431,250,000 yen, was "almost entirely satisfied by native production," and exports valued at 9,813,000 yen, said to be three times those of 1936, were recorded.

While Japan claimed to export to markets as far away as Egypt, her largest market was in Japanese-controlled Manchuria, where the domestic crop is far too small to satisfy the local demand and where there were a large number of Japanese—soldiers, officials, and

colonists—who still smoked the brands they learned to like at home.

The Japanese tobacco monopoly (the I.J.G.) has been much cleverer at merchandising than the government monopolies in Europe. It put out four widely advertised brands of cigarettes in packs of ten and tins of a hundred, attractively packed tins of smoking tobacco, and other products. Advertising and publicity campaigns modeled after those so familiar in America were especially designed to increase exports. But in 1939 writers in Japanese trade magazines complained bitterly that 80 per cent of the tobacco trade in China was still in the hands of British and American concerns. The I.J.G. was never able to compete in an open market with American and British tobacco products for quality or with Chinese or Indian bulk tobacco for cheapness. However, no government tobacco monopoly has ever been able to compete with free enterprise in any open market because the keen competition among private concerns keeps them much more constantly alert to the problem of gratifying the whims of the public.

Viewed strictly as an agricultural crop, Japanese tobacco should have an excellent future in a free market. Japan's climate and cultivation methods are particularly adapted to it, and her strategic commercial position should give her a great advantage in marketing. The principal competitors of Japanese tobacco in recent pre-war years have been the inferior leaf tobaccos from India and China imported by the I.J.G. to mix in varying amounts with the more expensive native tobacco in most of its products.

Tea. Tea is another crop that is particularly adapted to agricultural conditions in Japan because its production requires much diligent, skillful, patient labor both in growing the plant and in processing the leaf. Furthermore, it is a hillside crop that requires both plentiful rainfall and excellent drainage, and Japan is a land of hillsides. Apparently it does well in a somewhat acid soil, the type prevalent there.

The plant is a shrub belonging to the same family as the camellia that grows to a fair size in nature. In Japan tea is grown in closely spaced rows, either as individual bushes or in compact, rounded, beautifully trimmed hedges no more than three or four feet high set one above the other on the hillside.

Picking begins in late April or early May, according to the district, and usually lasts three or four weeks. The best tea comes from the new leaf buds on the tips of each twig; each succeeding leaf below furnishes a slightly poorer quality. Bruising the leaf reduces its

value; hence tea picking is a job for small, deft, quick fingers. Most of the pickers are women and children.

The plants continue to put forth leaves and there is a second picking a month after the first, and in some cases a third. In 1938 about 110 million pounds of tea were produced from approximately 100,000 acres of tea plants. Four per cent of the whole crop—4,400,000 pounds valued at more than 23 million yen—was exported that year.

The value of tea is determined by the district in which it is grown as well as by the size of the leaf and the care taken in processing. The finest tea from the Uji district near Kyoto retails for about one hundred times the selling price of the cheap bulk tea sold to the poor. The latter contains coarse leaves and bits of wood cut from the plant when it is trimmed. The best and the poorest grades are never exported.

The limiting factors in Japan's production of tea have been the government policy of maintaining self-sufficiency in food production at all costs, and the competition of the teas of China, India, Ceylon, and the Dutch East Indies. There seems little doubt but that Japan's production can be profitably expanded under a system of free economy.

**Garden Vegetables.** As elsewhere in the world, considerable acreage near cities and towns is devoted to truck crops which reach the market by pole-pushed sampans on the small canals that are common everywhere in Japan's most populous districts. Fresh vegetables are perishable, of course, and not subject to export. The commonest of all is the long white radish that may grow eighteen inches long and an inch and a half in diameter. Sliced and pickled, it is one of the most universal of all Japanese consumables; a few thin, limp, colorless slices of pickled radish are always served with fish, cooked or raw. It is shipped in considerable quantities to Japanese living abroad. There are no figures on the extent of this export.

During the late 1930's experiments were carried out in canning vegetables after the American manner with a view to competing with American products on the world market. There is no record of Japanese canned vegetables having been exported in any great amount, though there is a statement in one of the Japanese trade journals that in 1938 asparagus to the value of one million yen was grown in Hokkaido, the implication being that much of it was canned and exported to Europe and America.

The *Japan Times Yearbook* of 1938 gives 3,709,580 yen as the

total value of vegetables canned in Japan in 1935. No later total is available.

**Fruit.** This same source gives 3,821,032 yen as the value of canned fruit processed in Japan in 1935. The increase during the next five years was certainly very large. Although these figures are not broken down and no exact figures on fresh fruit production are obtainable, it is known that the bulk of Japan's canned fruit is oranges, though canned cherries and Bartlett pears appear in the display advertisements in Japanese trade magazines.

Pears and plums were imported from China more than a thousand years ago and local varieties have long been developed in Japan. Apples were introduced into northern Honshu by an American about 1880 and apple production has attained some local importance. Other deciduous fruits have been introduced from abroad from time to time and a wide variety are in limited commercial production. The famous flowering cherries and plums do not bear.

The only citrus fruit produced in commercial quantities is the Satsuma orange, named for the famous medieval daimiate in southern Kyushu. This is a free-skin orange similar to a tangerine, but somewhat larger; it is almost identical with the mandarin orange grown in southern China. This hardy orange is successfully grown where there is considerable winter frost and some snow. There are a number of groves as far north as Hiroshima on the northern shore of the Inland Sea. The orange canning industry originated at Hiroshima, and one brand that was widely advertised throughout the Far East was produced there at the outbreak of the war. Some fresh Satsuma oranges have been shipped abroad for many years and Satsuma trees and seeds were exported to certain districts in Texas, Louisiana, and Mississippi where the winters are too cold for other types of oranges.

The 1940 commercial yearbook of the *Osaka Mainichi* gives the production of canned oranges for the first six months of 1939 as 960,421 cases (the number and size of the cans in each case not specified); this indicates an enormous increase in orange grove acreage as well as a huge increase in the fruit canning industry in the immediate pre-war years. Nearly twice as many cases of canned oranges as of the second commodity, canned sardines (515,644), were produced in that period.

Canned oranges may be important in Japan's post-war commerce if standards of living in the Far East rise sufficiently to permit their wide sale.

**Pyrethrum.** Pyrethrum is a flower of the marigold type that, when ground to a powder, is widely used as a commercial insecticide. In 1886 a Japanese sent some native oranges to an American friend and received pyrethrum seeds in return. In 1938 Japan produced 11,000 tons, some 70 per cent of the world's production, of which 8000 tons were exported, 90 per cent going to the United States.

While pyrethrum is not as stable as certain mineral poisons such as arsenate of lead, it has a great advantage over the latter for both domestic and agricultural uses in that it is non-poisonous to human beings and higher animals. It can therefore be used with great success in controlling cattle parasites, cockroaches, carpet beetle moths, and the like, where mineral poisons would be dangerous.

Japan might easily increase her pyrethrum production, but apparently the world demand for it has been declining owing to the increased use of rotenone, a Brazilian product that has proved to be more effective for many purposes. Then, too, there have been developed several synthetic insecticides, chiefly from petroleum, which when blended with a small amount of pyrethrum have a greater killing power.

Just prior to the war a pyrethrum guild was organized among the farmers on Hokkaido, the principal center of production, to study means of improving the competitive position of their product. This effort died during the war as the farmers turned most of their land to the production of starches, oils, and fats to meet immediate war needs. However, extensive experiments were conducted to find new uses for pyrethrum and new methods of application. Several types of mosquito and vermin repellents were developed that have not yet been marketed outside of Japan. In the meantime tests conducted in California indicate that pyrethrum is more effective than either rotenone or oil sprays in killing certain types of citrus pests. Hence it is now impossible to determine whether the pyrethrum acreage should be increased or decreased after the war.

**Peppermint.** In 1935 a publication of the Japanese Bureau of Foreign Trade made the statement that Japan then produced between 60 and 70 per cent of the world's commercial peppermint crop, nearly all of it grown on the island of Hokkaido. It stated that owing to the fact that Hokkaido peppermint has a very high menthol content it could compete successfully with that grown in any other part of the world and that the prospects of increased acreage for this crop were bright.

The value of the crop itself has not been given for any year, probably because all of it was processed by several firms of pharmaceutical chemists in Kobe, Osaka, or Yokohama into menthol crystals and peppermint oil, 90 per cent of which was exported.

Menthol is widely used in medicines, in dentifrices, and to some extent in toilet preparations. Peppermint oil is used in confections and drinks as well as in a wide variety of medicines. The United States, Great Britain, and France were Japan's best customers for both of these products, the total value of such exports averaging about three million American dollars for the late pre-war years. In addition Japan sold about \$100,000 worth of mentholated lozenges to the Dutch East Indies and the South Sea Islands.

The Japanese have published no information on peppermint cultivation, except for the statement that they have evolved methods of producing a superior crop. There appears to be a growing market for this product and it may be of increasing importance in Japan's post-war economy.

**Forest Products.** There are about 50 million acres of forests in Japan, according to the latest estimate obtainable. About a quarter of this area is pine forest; the rest is mixed timber of many species. Japanese forests resemble those in the eastern part of the United States in that they have about sixty species of trees and bushes in common and that both contain a wide variety of trees. They contrast with the forests of our Pacific coast, where large areas may contain only one dominant species, or at the most three or four.

However, there are more than a hundred kinds of trees indigenous to Japan that do not grow anywhere in North America. Many of them, like the camphor tree and the bamboo, both of great commercial importance, are of tropical origin. Tropical plants and animals have become acclimated in Japan to heavy snows and a surprising amount of cold. Wild monkeys are found as far north as the latitude of New York City; monkeys in snow-covered pine trees are a favorite subject of Japanese artists.

It is important to note that there are only about a quarter of a million acres of primeval forest in Japan, most of it preserved for religious reasons. The rest is officially designated as "cultivated forests"—cultivated in the sense that it has been regularly "cropped" and either replanted or allowed to propagate according to a regular plan. In some places, particularly in the village-owned forest lands, poverty and the increasing demand for timber and charcoal in re-



cent years have led to the uneconomic cutting of small trees, although the Japanese have on the whole been far more intelligent in forest management than we in the United States. This has been due in part to the fact that in Japan nearly all of the forest grows on land that is fit for no other purpose and hence there has been no urge for wasteful clearing, in part to a different system of ownership, and in part to the Japanese habit of strict regulation and control of nearly every kind of human activity.

About 3¼ million acres of forest are the personal property of the Emperor and are administered as such. Between 18 and 19 million acres are government-owned and administered by a bureau under the minister of agriculture. Some 22 million acres are owned by private individuals or by subsidiaries of the big holding companies that control, or did control, so much of Japan's resources. What disposition was made of this land under the expropriation decree of January, 1943, is not known. It has been intelligently and conservatively exploited in the past. The comparatively small acreage owned by various temples and religious communities is not exploited at all, except for an occasional tree that is felled with great ceremony to be used in temple building.

Only the 10 million-odd acres owned or operated by public communities have suffered from overcutting. Since their regrowth is almost immediate, denudation and erosion are not widespread problems.

About 60 per cent of all the trees cut are used for building or for furniture manufacturing and three per cent of this is bamboo. Forty per cent becomes firewood or kitchen charcoal. The annual production of charcoal has the highest money value of any single forest product.

The ordinary litter of dead branches and pine needles that accumulates on the floor of the forests in other parts of the world furnishes the poorer Japanese with a considerable part of their household fuel. Forests and groves near any concentration of the population are literally swept clean. Secondary forest products are methodically harvested. Every year edible fungi (mushrooms, etc.) worth six to eight million yen are gathered in Japan's forests, as well as fruits and edible or medicinal bark that have about the same total value, and edible bamboo sprouts worth some four or five million yen.

About 80 per cent of all the trees cut for lumber are pine of one

variety or another. In normal times most of these go into building material. Though there are pulp mills on Hokkaido that use locally cut wood, most of the mills depend on imported material in peacetime.

The remaining 20 per cent may be roughly classified as hardwood used in making furniture, plywood, veneers, and the like. In addition, large quantities of bamboo are used in building and for a bewildering variety of manufactured products, from sliderules to toys.

It is estimated that the forests of Japan proper supplied about two-thirds of her own needs for forest products, but imports of these commodities are large. About 60 million cubic feet of timber and 327,000 tons of wood pulp were imported in 1936, principally from the United States and Canada. In the last six months of 1937 wood pulp imports rose to more than 450,000 tons because of the increased demand caused by the war with China.

Imports, as well as production and consumption, will probably approximate 1936 levels when conditions return to normal after the war.

*Camphor.* Camphor is a forest product whose gum content is processed from chipped camphor wood. For some years Japan has had a virtual monopoly of natural camphor produced from trees in Japan proper and in Formosa. Camphor is used as incense in the temples of various oriental sects, as an ingredient in several medicinal preparations, and in the manufacture of celluloid. In 1930 celluloid manufacturers in the United States alone required four million pounds of Japanese camphor.

Unfortunately for Japan, sales of natural camphor have been steadily declining, partly because various newly developed plastics have taken the place of celluloid for many purposes, and partly because India, second largest camphor customer, has launched a camphor program of her own which will make her increasingly independent of Japanese exports.

There will always be some demand for camphor for medicinal use, but this will be only a fraction of the total pre-war demand, when Japan's exports averaged 12 million pounds of oil and crude, with a value of \$2,000,000. Two-thirds of this went to the United States.

## IV.

# Animal Industries

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### SERICULTURE

Prior to the war Japan produced about 80 per cent of the world's supply of *commercial* raw silk. China probably produced considerably more silkworm cocoons than Japan, but China's methods were still primitive and the silk varied so in quality and kind that much of it was not satisfactory to modern industry. Most of it went into home-woven cloth for domestic use. The Japanese led in commercial production because Japan's methods of sericulture are modern and scientific. Until 1939 their principal objective was to produce highly standardized silk filaments that would meet the exacting requirements of the American silk stocking industry. How well they succeeded can be seen from the fact that 70 per cent of all the raw silk produced in Japan was exported, four-fifths of it going to America. Silk was Japan's great cash crop. It was the commodity she traded in the world market for the machinery and the technical and professional instruction that made her a great industrial and military power.

There are several insects of the moth family whose larvae spin filaments that are used as silk. At least three of them are found in Japan, but the only one of great commercial importance is the *Bombyx mori* that feeds on a species of mulberry tree, the *Morus alba*. Both insect and tree were imported from China twelve or thirteen hundred years ago.

Like all plants and animals that have long been domesticated, the tree and the insect have developed many local varieties in China, in Europe, and within Japan herself. This is the basic reason why there is such a variation in color, luster, texture, filament diameter, and tensile strength of the silk produced in different districts. There are many other factors that can affect its quality, such as disease, weather, feeding practices, etc.

When Japan first found herself selling increasing quantities of raw

silk abroad, her sericulture was in much the same primitive tradition-bound stage as China's is now. Method and product varied considerably from district to district throughout the country, though the greater part of the industry was concentrated in the northern extension of Honshu where the climate is more favorable to mulberry trees and miscellaneous crops than to rice.

The usual practice was to plant the trees in rows and keep them cut fairly close to the ground so they would put forth many leaf-bearing shoots within easy reach of the short-legged leaf-gatherers, for the silkworms are kept in racked trays indoors and fed there. Between the rows of trees the peasants plant vegetables and other food crops.

These practices are still maintained, but government-sponsored agencies have long since taken under their control the production and distribution of superior types of mulberry trees and their culture—including a scientific fertilizing program—the production of superior silkworm breeding stock, disease control, and the enforcement of standardized feeding methods, as well as methods of reeling and handling the silk filaments. All these efforts were directed toward obtaining a high degree of uniformity.

The principal agency through which sericulture is controlled is the National Sericultural Experimental Station, which determines what variety of silkworm is best suited to the industry. The insects most favored are first-generation hybrids, crosses between selected Japanese and Chinese or Japanese and European varieties. Selected eggs are distributed to experimental stations, which all together supply breeding stock for some 4000 licensed egg-card producers—the breeding moths lay their eggs on a small piece of heavy paper—that are controlled by local associations under a national federation.

These egg cards are sold to the 2,000,000 cocoon growers who are not permitted to grow their own breeding stock. In 1938 about 10,000,000 people were directly employed in cocoon production. They are organized into village guilds, the guilds into associations, and the associations into the great national federation. As in all Japanese organizations, authority and control descend from the top, and the ultimate top is always the imperial government.

The cocoon growers sell their product to the 50,000 silk reelers who unwind the silk from the cocoons by processes that vary in complexity. Most of them are small one-family operators. About 300

are cooperatives operated by cocoon-growers' associations, and some 2000 are large concerns employing more than 300,000 girls. The latter handle most of the high-grade raw silk intended for export. All these are grouped into associations with their own national federation. There is also a national association of silk exporters.

The annual production of raw silk for the period from 1936 to 1940 averaged a little over 700,000 bales and the average export was somewhat less than 500,000, valued at about \$130,000,000. On the whole the production of raw silk remained high during the 1930's and the quality increased steadily, but the price average has been only about a third of what it was in the boom days after the First World War. The price decline was due partly to the world-wide depression, but principally to competition from improved synthetics of the rayon type.

In 1939 the Japanese government, foreseeing that it would be cut off from the huge American market, began a program of re-orienting sericulture from the production of the types of cocoons that contain a high percentage of strong, uniform, elastic fibers suitable for stockings to types that contain the largest possible amount of any sort of filament suitable for the manufacture of mixed fabrics for domestic use. The results of this wartime expedient are not known.

Japanese sericulture is so efficient and well organized that Japan will probably continue to dominate the raw silk market after the war. The question is whether or not there will be any substantial market for raw silk. By 1938 synthetics had been produced that are said to exceed silk in every quality except elasticity, most desirable in hosiery. Then came the announcement of the perfection of a synthetic of the nylon type, equal to silk for that purpose. But nylon cannot as yet be produced for anything like the price of raw silk.

European sales of raw silk may be doubled if and when prosperity returns to Europe, because of the conservative nature of the European purchaser. This may compensate for any loss in American trade.

#### FISHING AND ALLIED ACTIVITIES

Japanese sources quote the *American Fishing Gazette* of January, 1940, as saying that the world's catch of fish was 33 billion pounds in 1938, of which Japanese fishermen got 6,600,000,000, to lead all

the nations. (The United States was second, with 4,840,000,000, Russia third, China fourth, Britain fifth, Norway sixth, Germany seventh, and Canada eighth.) Fish and other products of the sea have ranked third in Japanese exports since 1933, when they were valued at 80 million yen. In 1937 exports rose to 162 million yen—90 million in canned seafood alone—which was exceeded only by raw silk, over



400 million yen, and cotton textiles, about 500 million yen. Total exports for that year were 3175 million yen. All these figures are taken from government-sponsored Japanese publications.

The same sources stated that in 1939 the export of marine products was 210 million yen, and they enthusiastically predicted a "bright future" for the fishing industry.

However, these figures indicate only partly the importance of fisheries and allied industries in Japan. The Japanese consume enormous quantities of fish and other aquatic life. Nearly all the protein in their diet comes out of the water. Moreover, an unprecedented percentage of the population of Japan makes its living by fishing.

According to the 1941 commercial yearbook published by the *Osaka Mainichi*, the largest newspaper in Japan in point of circulation and possibly the largest in the world: "Of the entire population of 72,222,700 in Nippon proper in 1938, 1,442,713 were engaged in the marine products industry. However, when considering that the average family in Nippon has about five members, it could be said that from three to four million persons are making their living from the marine products industry. Though the number of men engaged

in fishing seems to be small in relation to the entire population, there is no other country in the world where 2 per cent of the population earns its living from fishing. Italy has a greater percentage of fishermen among European powers, but only 0.5 per cent of her entire population is so engaged."

**Coast and Deep-sea Fishing.** The Japanese themselves divide their marine products industry into two inclusive categories, coast fishing and deep-sea fishing. Under deep-sea fishing they classify (1) the operation of long-range seagoing vessels from fixed bases in Japan proper, particularly boats that customarily remain at sea more than two or three weeks each trip. (2) Fishing carried on from mother ships, floating canneries, and seagoing processing plants and from seasonal or more or less temporary shore bases overseas. This includes the operation of the floating salmon and crab canneries in Siberian waters and the "floating factory" whale ships in the Antarctic, and provided the greater part of the marine products the Japanese shipped overseas. These production sources were developed principally after the conquest of Manchuria to bring Japan badly needed foreign exchange and to lay up a store of canned food for her expanding army, as was frankly stated in Japanese publications of 1940 and 1941.

Under coast fishing the Japanese classify every other process of extracting from the water any form of life that may be edible or salable. In this category are included fresh-water fishing, fish and shellfish culture, seaweed gathering, beach seining, and offshore fishing in any craft that does not normally remain at sea more than a couple of weeks. These types of operations furnish most of the seafood for home consumption as well as exports of considerable value. Coast fishing methods produce more fish than the various deep-sea operations, but the catch from the latter is much more valuable. In 1938 the value of the former was 248,895,000 yen; the latter, 265,620,000 yen. The yen was then worth about thirty cents United States currency.

The latest available figures on the quantity of the total catch of coast fishing are for 1938.

Fish	. . . . .	449,431,000 <i>kan</i>	—about 3700 million pounds
Shellfish	. . . . .	31,169,000 <i>kan</i>	—about 256 million pounds
Seaweed	. . . . .	109,824,000 <i>kan</i>	—about 900 million pounds
Other marine animals	. . . . .	56,437,000 <i>kan</i>	—about 465 million pounds

According to a statement in the 1940 *Osaka Mainichi Yearbook*, the coast fishing catch decreased in quantity by 23.9 per cent in 1937, but the gross income was slightly higher because prices rose after Japan attacked China that year. A further rise in income was noted for 1938, but there were half-veiled complaints in numerous Japanese publications that many small cooperatives and fishing village associations were having a hard time of it, in contrast to the prosperity of the great corporations operating the deep-sea floating canneries. Federations of fishermen's societies were mentioned as "strengthening the bulwark against the capitalistic pressure upon the fishing industry."

The fish taken in the coastal operations are, in order of importance, sardine, salmon, sea bream, yellowtail, mackerel, herring, tuna, bonito, and flatfish (flounder, etc.). About twenty other species were listed, many with only Japanese names, but in no case did the yearly catch of any one of them exceed five million yen.

**Fishing Licenses.** Any notion the reader may have of the Japanese fisherman going gaily forth in his motor sampan, sailboat, or rowboat to catch any kind of fish wherever he might find them is entirely erroneous. He is restricted by custom and law either to certain definite areas or to a certain variety of fish—or both. These restrictions are specified on his license.

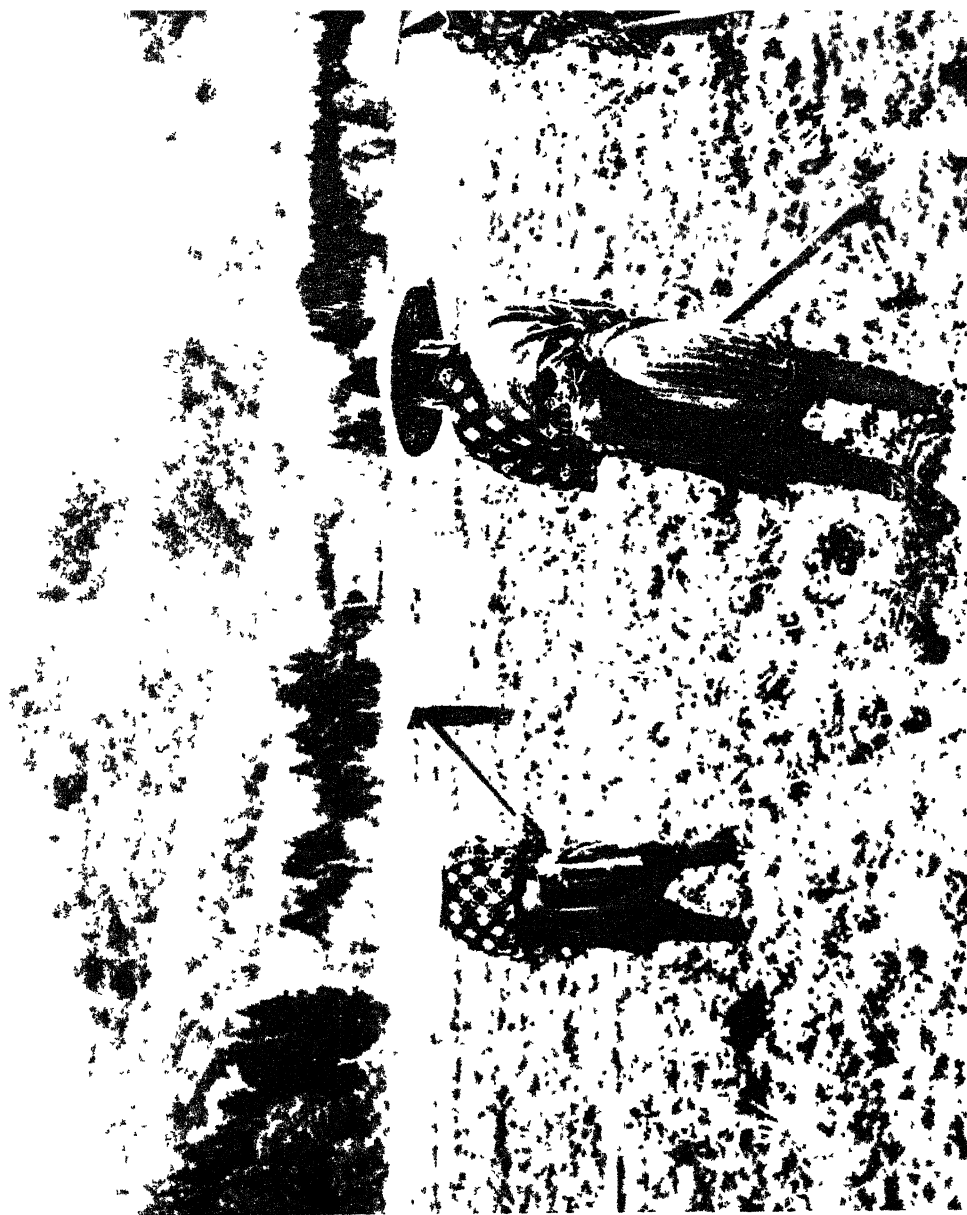
According to the last published accounts, there were 28,000 licenses for fixed nets and fish traps. Some of these devices are huge affairs that stretch for miles across inlets, channels, and estuaries to catch salmon, tuna, yellowtail, and herring during their seasonal migrations. The large ones are operated by cooperations, fishermen's associations, and a few wealthy individuals who employ several boats and scores of men. The smaller ones are the property of a single village association or a single family. In the latter case the device is usually a small trap set in the mouth of a tidewater creek or along the shore of a lake. In any case the property right to the fishing in that fixed location, though nominally a privilege granted by the crown, is a vested interest usually centuries old.

Twenty-five thousand licenses were issued for what is specified as "special fishing," which included the operation of drift nets, purse seines, and other free-floating devices in deeper water. Also included is "taking marine products other than fish." Squid, for example, brought Japanese fishermen 19 million yen in 1938, and shrimp 9 million; other forms of aquatic life—many of which are





Each little patch in this mountain-guided crazy quilt is a Japanese farm. Nearly half the fields are flooded rice paddies.  
(Acme)



griculture in Japan means  
annual toil. Here straw  
mulch is being laboriously  
worked into the soil. (*Press  
association.*)



Tiny rice fields are flooded, often by foot power. (*Press Association.*)



Rice seedlings are transplanted, one by one, by hand. (*World.*)



Weeding is another hand operation. The object to the right is designed to frighten away the birds. (*Acme.*)

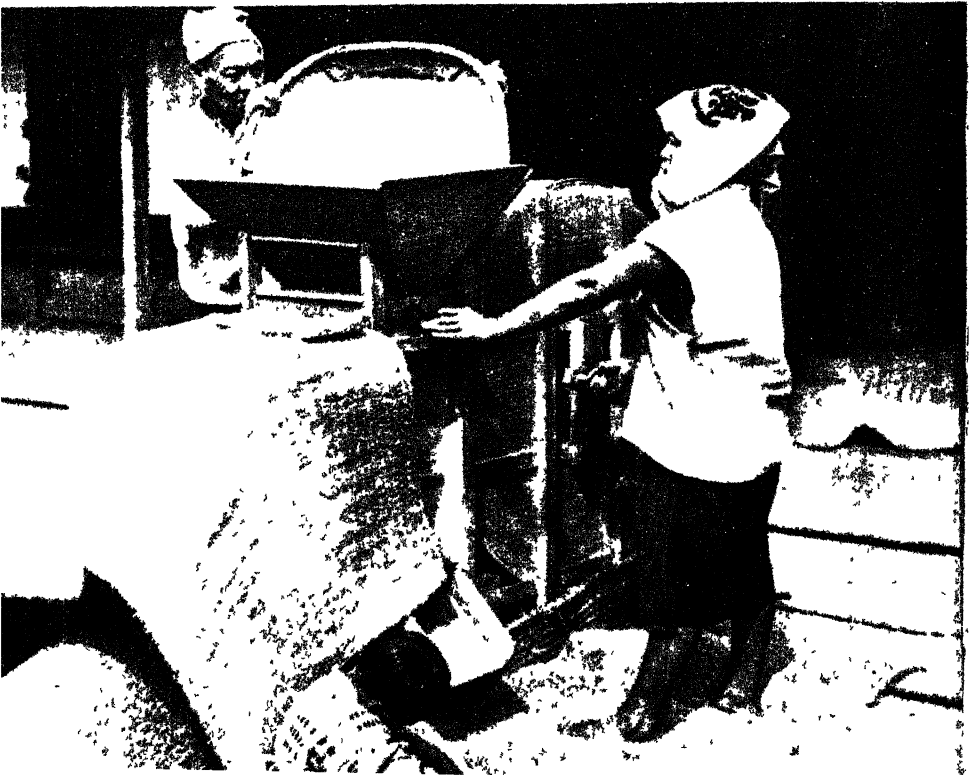


Most rice fields are drained before harvest. This was not (Press Association)



Drying . . . . . (*Wide World.*)

and hulling the rice crop. (*International News* )





Harvesting wheat, often grown  
in rice fields as a winter crop.  
(Press Association)

he went on with his experiments with typical Japanese persistency, won some scientific aid and counsel, and by 1918 began producing marketable pearls in quantity. His success caused a panic on the world pearl market and led to a court fight over whether or not his product could be sold as genuine pearls.

The weight of scientific opinion was now on Mikimoto's side and Dr. David Starr Jordan, probably the leading ichthyologist of the period, testified in his behalf: ". . . as they [Mikimoto's pearls] are exactly of the same substance and color as the natural or uncultured pearls, there is no reason why they should not have the same value."

The result was a world-wide depression in the price of all pearls and hard times along the Persian Gulf and other pearl-fishing areas. Later a compromise was arrived at, but the price of natural pearls never regained its former level.

The Mikimoto technique was improved with the aid of research conducted by the University at Tokyo and other government-sponsored scientists, and operations were expanded until by 1938 the Mikimoto family had eight great pearl-oyster beds covering 41,000 acres, and more than a thousand people on its payroll, including the staff of several well-equipped laboratories.

Five hundred diving girls gather three-year-old oysters by the millions from the nursery beds. Of these, about 15,000,000 are selected for treatment. Microscopic bits of fresh-water mussel are inserted into their bodies, the wounds are cauterized, and the oysters are then set out in iron baskets suspended from bamboo rafts so that they are kept a few feet from the ocean bed. Here they are periodically inspected and tended for seven years, when they are ready to be opened. About 60 per cent of the treated oysters produce pearls, of which about one-half of one per cent are of commercial quality.

In 1939 the Japanese Chamber of Commerce in New York published the statement that the Mikimoto concern "produces jewels valued in excess of \$2,000,000 annually." As this is more than three times the value of the pearl shell produced, it shows that shell is the by-product and pearls the main product—which is exactly opposite to the situation in natural pearl fisheries.

**Special Area Fishing.** Five thousand permits are issued under the classification of "special area fishing," which may be termed the poor man's fishing. The number of individuals engaged in it is in no way indicated by the number of permits, for they are issued only to



fishermen's cooperatives, one of which may include the entire adult male population of several coastal villages. Total membership exceeded 600,000 in 1939. Each cooperative divides the privileges granted by its permit among its members, according to long-standing local custom.

Their operations include beach seining, various types of net fishing from small boats, most of them without motors; hook-and-line fishing from boats and barges; the gathering of various types of mollusks and crustaceans—clams, oysters, squid, octopuses, crayfish, etc.—and the gathering of edible seaweed, principally of two kinds. In other words, this category includes the remnants of all the old traditional methods of taking seafood (except by the use of large, fixed nets) that played such an important part in feeding Japan before the advent of the large motorized fishing boats and the great floating canneries and processing plants, and the development of icing and freezing.

Special area fishermen, having no means of refrigeration, must confine their activities to shore or near-shore operations, for spoilage is rapid in Japan's climate in most seasons, and the catch must be marketed as soon as possible. Fortunately Japanese coastal waters are rich in sea life, in either the Inland Sea, the near reaches of the Sea of Japan, or the bays and estuaries on the Pacific side. But with comparatively primitive equipment, the amount of fish taken per man-hour of labor is small and the seasonal income of the individual fisherman is small indeed.

However, fishing in this category is of great economic importance to Japan because a comparatively large percentage of the population in certain coastal areas makes its living thereby and because it produces a great deal of the seafood consumed at home. As a source of marine products for export its importance has steadily decreased. In the Tokugawa period dried squid and dried seaweed taken and processed by these offshore fishermen and sold to Chinese merchants at Nagasaki bulked larger than all of Japan's other exports. The same products still go to China, probably in far greater amounts, but proportionately these exports have been insignificant since the development of modern processing.

As already indicated there is considerable traffic in seaweed that is gathered and processed by "special area" fishermen. It is of two kinds, Kanten and Konbu. Kanten (*Geleidium cartilagineum*) is gathered in the fall and winter in the colder districts. It is spread on

the beach and allowed to freeze—an operation necessary in its processing. It is sold to the world as agar-agar, a substance used for a cultural medium for bacteria, as well as a commercial substitute for gelatin and an agent for textile finishing. Konbu (*Laminaria*) grows on the rocky sea bottom in fairly deep water and is widely used in cooking throughout the Orient.

With the exception of pearls, the total exports of all the products of the special area fishermen did not bring the Japanese government enough foreign exchange to be considered important; hence this group was for a long time the neglected stepchild of the fisheries bureaus. The carefully controlled Japanese publications frequently hinted that there was serious discontent among them. The *Osaka Mainichi* stated more than once, "They [the fishing villages] are not like the farming villages," the latter being notoriously compliant under their burden of debt and poverty, largely because the peasants have always been firm in their loyalty and belief that the army, largely staffed by their own sons and the sons of small landowners, would win a great empire that would put an end to their misery.

The situation of the small fishermen became so desperate that the National Fisheries Law was amended in 1933 in favor of the special area fishermen. Their cooperatives were permitted to handle sales and make purchases for their members, as well as undertake banking functions—accepting deposits from members and making loans at a low rate—and make benefit payments for death and injury. They were granted exemption from some taxes and protected against ruinous competition from steam trawlers and large seiners operated by corporations and wealthy individuals.

**Trawler Operations.** Japanese trawlers are boats of from 100 to 300 tons burden, driven by steam or internal combustion engines, that drag a heavily weighted purse-shaped net along the floor of the sea to catch all types of bottom-feeding fish. Therefore they operate in shallow seas and fairly close offshore, in direct competition with the small-boat fishermen. Not only did their power-operated drag-nets take huge quantities of fish, but they were charged with damaging or destroying certain breeding and feeding grounds that were the sole source of livelihood for many villagers. This led to the usual protests, suicides, and assassinations, and finally to the curtailment of trawler operations in coastal waters immediately adjacent to Japan proper.

The government commenced to enforce control regulations against the trawlers as early as 1909, but the number of these vessels continued to increase until 1912, when there were 139 in operation. Most of them were sold during the First World War when trawlers brought a high price for use as mine sweepers. Their number increased after the war, with consequent agitation against them, and a law was passed limiting the total number to 70. However, there were 75 in January of 1939, 53 of them owned by the great Japan Marine Products Company, though most of them were operating off the coast of China. Shortly afterward the imperial navy began to take over trawlers. They were used for many purposes, even as transports; a large number have been destroyed.

Trawler fishing is not to be confused with trawl-line fishing. Trawl lines are lines several hundred feet long, to which hooks on short leaders are attached at intervals. They are used extensively in both offshore and deep-sea fishing.

**Bonita, Tuna, and Shark Fishing.** The taking of bonita, tuna, and shark by hook and line is an important factor in Japan's fishing industry. Bonita are taken by both offshore and deep-sea operators. Many tons of fish are caught from small boats and from anchored floats and barges immediately offshore; at the beginning of the war there were also about a thousand boats of from 10 to 200 tons engaged in this kind of fishing. Although all the boats were based in Japan proper, they could and did remain at sea from several days to several weeks; the larger boats covered fishing grounds a thousand to fifteen hundred miles away.

The bonita catch is large, averaging about 200 million pounds annually; the value of the 1937 catch exceeded 30 million yen. The major part of the catch is processed by a unique and complicated method so old that its origin is unknown. The fish are first steamed, then smoked, and then dried in the sun on the beach, the whole operation taking three or four months. During this time three kinds of mold grow on each piece, first green, then white, then brown. Reports of research conducted by Japanese biologists maintain that the growth of these fungi change the character of the protein in the fish. At any rate, the finished product looks like a small billet of firewood and has about the same consistency. Nevertheless it is a popular article of food; the Japanese housewife chops or scrapes off small bits to flavor soup or to cook with other fish or vegetables.

Considerable quantities of bonita are sold fresh and eaten either

cooked or raw. It is customary in many Japanese restaurants to serve alternate slices of white and red raw fish with soy sauce and a relish; the red is usually bonita.

Boats operating from bases on Japan proper take only about a third as much tuna as bonita. Much of the tuna catch has been canned in recent years, but a great deal of Japanese canned tuna came from canneries operated by the Japanese overseas.

Most of the shark catch comes from the Sea of Japan. The boats used are small, many of them two-ton sampans without motor power. The four- or five-man crew sets out a heavy silk trawl line about five miles long to which leaders are tied every 150 feet, each bearing a large hook baited with a mackerel. The line is supported by several floats made from barrels. Two hours later the line must be hauled in, a job that involves an hour of back-breaking labor, or longer if several large sharks have been hooked.

As the sharks may be as much as 18 feet long and weigh upwards of a ton and there may be ten or twelve on the line, shark fishermen must be men of great strength and considerable courage. The fish are killed by a blow on the nose with a short-handled mallet, a dangerous operation that requires skill. For these reasons shark fishermen tend to be a race apart.

For hundreds of years the flesh of sharks has been eaten in Japan. It is the chief ingredient of a boiled fish paste called *kamaboko* that is sold wherever there are Japanese. A few years prior to the war the Japanese developed a considerable market for sharkskin leather, and for shark liver oil and various vitamin compounds derived from it. These industries were growing rapidly, though no exact figures on them are available.

**Deep-Sea Fishing: Crab Fishing.** In 1920 one Teisuke Wajinki conceived the idea of establishing canning factories on sailing vessels, thus making it possible to exploit crab fishing grounds far from Japan. Crab meat had been canned in Japan proper since 1887, and had been an increasingly important export article after 1907 because the flesh of the big Japanese king crab became extremely popular in Europe and America. By 1918 the crab fishing grounds within feasible distance of the shore canneries in Japan were being exploited to capacity.

Wajinki's ship was so successful that huge steam-powered floating canneries were immediately constructed. By 1933 nine of these

vessels were operating in Soviet waters some ten or fifteen miles off both shores of the Kamchatka peninsula. The number was reduced to eight in 1938, and only one operated on the eastern (Pacific) side of Kamchatka. The output continued to increase, the eight producing 253,000 cases in 1938, about 50,000 more than the total output of the nine operating in 1937.

All of these ships were owned by the huge fishing trust, the Japan Marine Products Company (Nippon Suisan Kabushiki Kaisha). These crab canneries and the thirty boats that operated from them employed about 2500 men. The crabs were taken in drift nets, fixed nets, and trawls and were promptly delivered to the mother ship where they were canned immediately. The conveyer system was used and both the equipment and its operation were entirely modern.

The species of crab used for canning, the *taraba* or king crab, is found in quantity only in the northwest Pacific. It is very large, its leg spread being as much as five feet in some cases.

Land canneries on Hokkaido and the northern part of Honshu were still producing a large part of Japan's total output in the years immediately preceding the war, but the floating canneries were becoming an increasingly dominant factor in the industry. The Japanese government did everything in its power to promote and expand their operation, and put great diplomatic pressure on the Soviet government to allow them to continue, for a great part of their product was exported and hence constituted an important source of badly needed foreign exchange. Exports of canned crab meat were particularly important because some 70 per cent went to America, always the best-paying market.

*Salmon.* In 1938, the last year for which the Japanese published any considerable amount of data on salmon fishing, 150 million fish were taken—10 million by offshore operations in northern Honshu and Hokkaido, 60 million in Soviet waters, and 80 million in north Chishima (the northern Kuriles). The latter probably included considerable fish taken off Kamchatka, in the Bering Sea and even off Alaska, although these operations were not usually mentioned in published reports.

By the Treaty of Portsmouth in 1908, Japan claimed control of nearly 90 per cent of the fishing grounds off the Siberian coast. This was reduced to 65 per cent in 1929 by agreement and was further

reduced in 1935. By 1938 the Japanese claimed that they were operating in only 386 fishing "lots," whereas the Russians retained the rights in 409.

The bickering between the Russians and Japanese over fishing rights—which the Japanese alleged included the use of certain shore areas for bases and even for canneries—amounted to undeclared war on several occasions, both sides avoiding an actual declaration because of other involvements. Largely because of difficulties with Russia over fishing bases, the Japanese began to operate floating salmon canneries patterned after the crab canneries that had already proved so successful. In 1938 seven of them were in operation, principally off the east coast of Kamchatka. A fleet of 170 boats caught about 10 million salmon for these seagoing canneries, about half of the catch being the valuable red salmon; so while the Kamchatka catch constituted only about one-sixth of the total caught in Russian waters, its value was out of all proportion to its size. It even exceeded the value of the crab catch for that year by approximately a million yen.

About 90 per cent of the fish taken by the Japanese in all Siberian areas was salmon of four types, red, silver, white, and salmon trout. Fifty-three per cent were taken by drift nets, 47 by fixed nets, and a few by trawl lines. The amount of the catch that was canned was determined by the overseas demand for canned salmon; this export always exceeded every other marine product in value. In the first half of 1938, 465,166 cases were exported and a goal of 885,000 was set for 1939. However, it is doubtful if this was reached. Exports fell off 118,000 cases for the first six months of that year, because exports to Britain, half of whose imports of canned salmon usually came from Japan, were reduced 69 per cent, and those to France, normally Japan's second best customer, were reduced more than 90 per cent.

Other methods used to preserve salmon were freezing, smoking, and drying. Frozen fish of all kinds were rapidly taking an important place on the Japanese market in the years just before the war.

Practically all the fishing in Siberian waters was conducted by two huge corporations. The first is the Nippon Suisan Kabushiki Kaisha, or Japan Marine Products Company, already mentioned. This firm was capitalized at 93 million yen, the principal shareholder being the Manchurian Heavy Industries Corporation. It not only operated all the floating crab canneries in the northern seas but con-

trolled three-quarters of the trawler industry and all the antarctic whaling, owning most of the mother ships engaged in those waters and operating those owned by other companies.

Significant comment on this concern appeared in the *Osaka Mainichi Yearbook* for 1941: "Its trade department gives attention to the acquisition of foreign currency through the promotion of foreign trade . . . rushing the construction of fishing vessels and increasing the facilities for cold storage and the production of ice." This was long after the imperial government had stopped all production for civilian needs. Elsewhere the same publication says frankly that the feverish activities of Japanese fisheries in Siberian waters were due to the pressing need of the government to obtain foreign currency and "to lay up food supplies for the armed forces."

The Japan Marine Products Company continued to pay its stockholders a 12 per cent dividend as late as July, 1940.

The Nichiro Fishing Company (Nichiro Gyogyo K.K.) is the other gigantic corporation. Capitalized at 87 million yen, it controlled virtually all the salmon fishing in Soviet waters and, according to the above-mentioned yearbook, "plays no small role in Nippon's acquisition of foreign currency."

It can be seen from the foregoing that these two corporations were monopolies fostered by the Japanese government for the specific purpose of obtaining foreign currency and stores of food to meet the needs of an expanding military program. It is obvious that these activities will be entirely eliminated after the war and that this will have little effect on Japan's economy as a non-military nation, except in one regard. These activities gave employment to about 20,000 men for four or five months of the year. Each of these men would return to his poverty-stricken village in northern Honshu with about 200 yen, which meant the difference between subsistence and starvation for himself and his family. The economic life of many small coastal communities was dependent on those wages.

*Whaling.* Offshore whaling was an important industry in Japan for several hundred years, but modern whaling, involving long cruises and harpoon guns, did not come into existence until 1899. By 1906, 25 whalers, owned by twelve companies, were in operation. Mergers began to take place and after the institution of the mother-ship system of whaling in 1934 the Japan Marine Products Company dominated the field.

In the 1938-39 season 6 of the 30 factory ships operating in the

antarctic whaling grounds were Japanese; their production of whale oil amounted to about 80 thousand tons, or nearly one-sixth of the total of 440,000 tons. In that year Japanese publications boasted that "important technical positions, gunners and others, formerly held by Norwegians" on the 49 Japanese whale cruisers operating with the factory ships "are now all held by Japanese." Here is another indication of how the Japanese got rid of foreign technical experts as rapidly as possible during the period immediately preceding World War II.

After the war in Europe broke out in 1939, the price of whale oil rose from 6 to 15 cents a pound and Japan sold almost her entire output to Britain. Returns from the 1940 catch amounted to \$30,000,000. Japan needed the British money for her war effort, but Britain's need for the whale oil, an important ingredient in butter substitutes, was even greater.

All the by-products of whaling went to Japan—the skin for leather, the bones and all other residue for fertilizer, for both of which she had a crying need.

Whale leather, like sharkskin, became important in Japan's economy just before the war. It is extensively used in military equipment, obviously because of the scarcity of cowhide and horsehide. How much truth there is in the Japanese boast about the superiority of whale and fish leathers is not known.

In any consideration of the future of the marine products industries in Japan it is well to note that the Japanese have always stoutly maintained that too many people (about 27 million) are making a living, or attempting to make one, from agriculture and not enough from fishing and allied activities, despite the fact that a larger percentage of the population is already so engaged in Japan than in any other country.

By implication most Japanese writers contend that this increase in employment can be furthered in three ways: (1) By exploiting the waters in and around Japan proper more efficiently; (2) by expanding activities in distant waters and on other shores; (3) by curtailing the activities of the great corporations and furthering those of fishermen's cooperatives.

As regards the latter, the Japanese government was faced with the same dilemma that arose in many other instances just before the



war. The increasingly dominant element, the military cliques, hated the capitalists and had a strongly emotional, almost religious, antipathy to the acquisition of wealth. They had no interest in advancing the economic condition of the individual fisherman, but they did wish to advance the interests of the fishermen's associations as against the capitalistic corporations, because in their view of the future all of Japan's production facilities would be in the hands of strong, paternalistic, non-democratic guilds directly answerable to the imperial government and functioning as closely integrated units to advance its power.

On the other hand the military's immediate interest was in acquiring arms and materials of war. The great fishing corporations with their expensive equipment were among Japan's best producers of goods that brought in the foreign exchange needed for that purpose. They were also the best producers of the highly concentrated protein foods needed for the military stock piles. Hence, as a temporary expedient these corporations were favored and allowed to make huge profits.

Whether or not their equipment was confiscated under the decree of January, 1943, is not known and would be of only academic interest because at least 60 per cent of their activities was carried on in foreign waters where the Japanese will probably not be allowed to operate after the war. It is likely that Japanese deep-sea fishing will be confined to strictly pelagic operations. It is doubtful whether the number of men engaged in fishing will ever equal that during the late pre-war period, no matter how or by whom the operations are carried out. However, with a change of objective from export for cash to more fish for Japan, the result may be larger numbers of fishermen with small boats and less complicated and expensive equipment.

Any expansion of fishing activities in the immediate vicinity of other shores certainly will not be tolerated, if only because of Japan's past use of fishermen as spies and *provocateurs*. Expansion and increased efficiency in fishing and aquatic culture in and around Japan proper are undoubtedly possible, despite already extensive exploitation. The extent of either or both and the amount of increased employment and production that may result depend on factors too complicated for discussion here.

## LIVESTOCK

Japan is one of the poorest countries in the world in livestock. For example, there are only 6 recognized national political units that have fewer horned cattle than Japan, whereas there are 49, including such countries as Cuba, Iceland, Denmark, Belgium, Rumania, Finland, and Madagascar, that have more. Japan has fewer meat-producing animals in proportion to the population than any other nation on the earth. The reason for this is that it requires six to eight pounds of agricultural products to produce one pound of meat. With limited exceptions, Japan must grow on her intensively cultivated acres products than can be fed directly to human beings.

**Cattle.** There were less than 2 million horned cattle in all of Japan proper in 1940. About two-thirds of these were dairy stock, most of them on Honshu near the large cities, where a considerable portion of the wealthier inhabitants had learned to use milk and butter from the European residents. The comparatively high prices paid for dairy products made their production feasible in these areas in spite of the keen competition for available land. Pastures were of course limited and the principal types of feed were oats and barley straw, bean cake and fish meal or fish meal cake.

One-third of Japan's cattle are beef animals. Nearly all of these and part of the dairy cows are bred on the island of Hokkaido, where agricultural conditions are entirely different than on the three teeming southern islands.

Until the end of the Tokugawa era in 1868, Hokkaido was a frontier land inhabited by Ainu tribes; there were a few isolated villages of Japanese fishermen and traders. Efforts to colonize it began right after the restoration, partly to relieve the increasing pressure of the population in the rural districts of Honshu and partly to stem any possible Russian move to seize the island. The Japanese peasants were reluctant to move north, for Hokkaido's long, cold winters and comparatively dry, cool summers make rice culture impractical; hence it was necessary for the settlers to assume an entirely new way of life. The island still has only a little over 3½ million people. The average size of the farm operated by each agricultural family is said to be almost 90 acres, unusually large for the Orient. Agricultural methods are much like those in certain parts of New England, New York, and Pennsylvania where climatic conditions are somewhat similar. The Hokkaido farmer grows most of his feed, has con-

siderable pasture available, sells his beef and butter to the great cities in the south, and is altogether more prosperous than Japanese peasants elsewhere.

After Japan conquered Manchuria, colonization efforts were shifted in that direction and Japanese economists began to consider Hokkaido as a potential cattle-breeding territory. They maintained that if every artificial stimulus to increase the human population were removed, Hokkaido could ultimately support 80 to 90 head of cattle per farm family, or about 11 or 12 million head, and Japan might become a beef-eating rather than a fish-eating nation, and hence more militant. More important from the point of view of the Japanese, who were always on the outlook for possible large-scale exports, a huge increase in butter production would be assured. These same economists foresaw Hokkaido as rivaling Denmark in butter exports. By 1938 Japanese trade publications were boasting that exports of butter from Hokkaido to Great Britain that year exceeded a million pounds.

Whether beef and butter can play any important part in Japan's post-war economy is highly conjectural. The Japanese themselves always have been fish eaters, and fish certainly will continue to be much cheaper than beef. Few except the Americanized wealthy Japanese in the cities have acquired a taste for butter. The development of an export market for Japanese beef and butter is problematic indeed.

It is interesting to note that in spite of the well-publicized emphasis on the production of these two commodities, the island of Hokkaido produced more horses than cattles in the years between 1931 and 1941. The imperial army wanted horses.

**Horses.** In 1935 there were a million and a half horses in Japan, roughly one to every 46 human beings. There was one horse to every 7 human beings in the United States at that time.

The proportion of horses to men in Japan would have been much lower, probably less than one to 100, if it had not been for the army's continual effort to increase the horse population by promoting breeding at home and the importation of European and American animals. The military character of these importations is made clear by the fact that they never appear in any of Japan's recent trade figures, however, other sources disclose that they totaled between 2000 and 2500 head in normal years.

Twelve or fifteen years ago, prior to the army's coup in Manchuria,

there were probably no more than six or seven hundred thousand horses in the Japanese islands, only a few of which were used in agriculture. As the farm of the average peasant proprietor is a 2½-acre paddy field, a horse would be a white elephant on his hands. It would eat more than half a dozen sturdy sons and daughters and would be infinitely less useful in the knee-deep mud of his rice patch.

Such a farmer could never in a lifetime gather enough cash reserve to buy a horse, but if some beneficent agency should give him one he would be greatly honored. Horses come close to being sacred in the nationalistic Shinto cult, which has its strongest following among the peasantry. All along the byways of Japan are small wooden shrines built in honor of the horse. Their only decoration is a small object of plaited straw, the primitive Japanese equivalent of a horseshoe.

The farmer, in spite of his inevitable and unbelievable burden of debt, would probably manage to get enough timber to build a stable in which the horse would stand with his head, rather than his tail to the door. Horse and stable would be decorated with religious symbols, both Shinto and Buddhist, to assure good luck, and the farmer and his family would work the mud of their rice field a little more desperately to provide for a well-nigh useless star boarder. If they were saved from bankruptcy it would be because the other families in the village felt so honored by the presence of the horse in their midst that they would bring presents of rice straw, husks, a few little bundles of grass from the ditch bank, and perhaps a little millet and barley when they came to stare at the animal.

There is at least one national shrine where horses have been kept as an adjunct of worship. These are the true native horses, sturdy, short-legged, pot-bellied animals, obviously descendants of Mongolian ponies imported into the islands at some time in the prehistoric period. No doubt one or more of the races that invaded Japan from the mainland of Asia to displace the aboriginal Ainus were horse-riding nomads. There is no horse cult among the Ainus; they worship bears.

Horses were of far greater economic and social importance in Japan during her abnormally extended medieval period, when epidemics and feudal wars kept the population reduced below the point where its food needs exceeded the productive capacity of the land. Individual holdings were much larger. The peasants them-

selves had some horses and other work animals. The man-at-arms, who was the immediate overlord of each ten or dozen peasant families, had to provide himself with one or two mounts.

Horses were important in intra-island transportation, even in medieval times, for the great network of canals that now carry such great portions of Japan's local freight in the heavily populated areas was developed rather slowly. Until the army began its wholesale requisition during and after 1937, the majority of the horses were still engaged in carting goods of one kind or other.

The standard conveyance for this purpose was a one-horse wagon with a long bed box and a very narrow tread which enabled it to negotiate the narrow streets characteristic of most Japanese towns, from hamlets to great cities. The carter who drove the vehicle usually owned the horse and functioned as an independent common carrier, much like the carters in rural England a few generations ago. Many of the blunt flat-bottomed freight boats on the canals were horse-drawn. We use the past tense in both cases here, not because the horse has failed to survive competition from other sources of power, but because the army has literally swept the islands clean of all the sound animals.

Japan, by the way, is the only modern industrial nation in which man power has continually been the most serious competitor of horse power. According to the latest figures obtainable, in peacetime there were only 90,000 privately owned motor vehicles in all Japan, including trucks. There are thousands of miles of Japanese streets and more thousands of miles of canal towpaths where no motor vehicle large enough to be of practical value can operate. There the long, narrow horse-drawn cart has for its competitor a sort of dray drawn by two men, as well as carts and burden-bearing porters. Along the canal banks men compete with ponies for the tow lines of every barge. The human hauler has won out during the war. Japan's losses in horses have been much more severe than her losses in men because she began the war with so few horses.

The Japanese became acquainted with horses of the European type shortly after Commodore Perry opened the ports to world traffic. Foreign horses of various breeds were among the gifts sent to various officials; the Japanese were tremendously impressed by them, particularly their size. There is a tradition that the Dutch sent a few big Flemish horses during the centuries that they had a monopoly of Japanese trade and that their blood modified the size and con-

formation of a considerable portion of the native ponies, until the true native horse became rather rare except in some secluded districts or where the native strain was deliberately preserved as a religious symbol. Importation of horses seems to have been casual and sporadic for many years because the horse was not important enough in Japan's economy for the government to undertake any definite program for its improvement.

In 1888 some English merchants who had imported Thoroughbreds from home organized the Nippon Turf Club at Yokohama. This was tremendously important in view of later military developments. The Japanese at this time were going through one of their recurring spells of Anglomania and racing shortly became a fad. No country in the world, not even the United States, takes to a fad with such frenzy as does Japan. All the larger cities went horse-mad, or more particularly betting-mad. Several additional tracks were opened and various Japanese merchants and officials acquired racing stables.

Not much has been published on the subject, but evidently the army became interested in propagating Thoroughbreds quite early, probably after its acquisition of prestige and power as the result of the astonishingly easy victory over China in 1895. When the army began to import horses for its own purposes is difficult to determine, for what the Japanese army does is seldom a matter of public record. We do know that between 1900 and 1905 the Japanese imported some 30 Thoroughbreds from Australia, apparently for racing only. It is known that other Thoroughbreds were imported during that period and earlier from various European and American countries. The army, the imperial family, and several notables established studs, according to unofficial reports coming out of Japan at that time. The fact that little or nothing about these establishments ever appeared in print betrays their essentially military character.

In the meantime racing became a rather smelly racket in Japan, just as it did in certain sections of the United States during the same period. There were a number of bankruptcies and suicides, some affecting high-placed families; consequently a decree was issued in 1909 abolishing racing at all tracks "at which pari-mutuel tickets with unlimited dividends and sweeps were sold." This quotation comes from a Japanese periodical published in English. It is

inferred from other sources that a specific injunction against book-making was likewise issued.

The Japanese army put up a vigorous, unofficial, and undercover protest to this decree on the grounds that it would have an adverse effect on the breeding of Thoroughbred horses, the furtherance of which the army said was a military necessity. However, the army was not in the saddle politically during this period, and what amounted to a prohibition of racing remained in effect until 1923.

This had exactly the result the army predicted. The breeding of the Thoroughbred, still on a small scale, declined, and importation, other than that carried on by the army with its own funds, all but ceased. So in 1919 the Diet passed a law placing the eleven major tracks directly under the control of the minister of agriculture and industry. The new law set the maximum bet for any one person at 20 yen. Bets could be made only on winning horses. Bets on the second and third horses in any race were specifically forbidden. The maximum odds paid on any horse was 10 to 1. Eighty-two per cent of the pool on each horse was paid to the winning betters, 11½ went for the maintenance of the Racing Association. What happened to the 9600 yen remaining in a 10,000-yen pool when a long shot came in on which only two 20-yen tickets had been sold is not disclosed. By all Japanese precedent the imperial government got the money.

The new racing law did not go into effect until 1923. It instituted such great odds against the betting public that even the Japanese, who are among the world's most inveterate gamblers and are thoroughly conditioned to being mulcted by their government, complained bitterly and refused to patronize the tracks.

In 1939 the law was considerably modified in the public's favor, "place" bets being legalized and other restrictions somewhat ameliorated. Public interest in racing was revived. The semi-annual six- or eight-day meets at the eleven "official" tracks drew greater crowds each year. Pictures taken during the 1940 meet at the Fuchu race course in Tokyo show large ultra-modern grandstands and clubhouses, and crowds that pack every available inch of space from the clubhouse roof to the track rail.

Japanese accounts put the pari-mutuel "take" in the 1940 summer session at Fuchu (eight days) at 29,297,880 yen, and the average daily attendance at 35,000—this in a country whose people

were notoriously underpaid and overtaxed and who were already being stripped of every comfort and luxury to satisfy the needs of the imperial army and navy. The Japanese press of that year repeatedly referred to racing as a "200,000,000-yen industry" and "one of our great industries."

The eleven major tracks and the 2600 government-registered Thoroughbreds eligible to race thereon do not tell the whole story of Japanese racing. There were in 1940 more than a thousand local race tracks scattered throughout the islands, roughly comparable to the tracks at state, county, and regional fairgrounds in the United States. Horses of mixed blood, sometimes even native ponies, raced at these tracks. These were the races of the poor. A "sheet" of betting tickets cost one yen in 1940. As the purchasing power of one yen probably did not exceed that of a fifty-cent piece in the United States at that time, the price of each individual ticket—the number in each sheet seems to have been quite large—was infinitesimal.

That the military authority has been backing Japan's racing program for its own purpose is clearly demonstrated by the fact that racing was not only continued but encouraged three years after the Japanese began stripping themselves for war and one year after the military clique had taken entire control of the imperial government. After the war had been in progress more than a year, the captain of a U.S. submarine witnessed a well-attended horse race through his periscope.

In the late 1920's a delegation of Japanese army officers, several of them of distinguished families, were sent to Europe to study methods of horse training and to buy horses. Their immediate objective was to enter the equitation events in the tenth Olympiad to be held in Los Angeles in 1932 and win what glory they could for the empire.

These officers spent some time in Sweden, Germany, Austria, Italy, Holland, France, England, and Ireland, surveying the horse market and studying the training methods, both military and civil, in use in each country. They purchased a number of selected horses, all highly trained, and all proven winners in various events, particularly at the jumps.

A number of these officers appeared in Los Angeles well in advance of the Olympic meet with their horses—all huge animals, in the opinion of one very competent expert, "too large, even for jumpers"—and their European trainers. They established themselves at



the Riviera Country Club where the events were to be held and went into training with characteristic methodical thoroughness, concentration, and singleness of purpose that largely overcame their initial handicaps—for none of these Japanese had the inborn aptitude that marks the “natural horseman” and they were physically ill equipped, with their short arms and short, round legs, to compete on greatly oversized European horses with equipment designed for larger men.

They took several places in the various events and a titled Japanese officer won the celebrated Grand Prize event on a huge French jumper.

Thereafter the army continued its remount program under its usual cloak of secrecy, at the same time encouraging racing and other forms of civilian equestrianism, as well as horse breeding. “We are interested particularly in Anglo-Norman [*sic*] Thoroughbreds and Arabian horses,” wrote one Japanese officer in a native publication. We are allowed only such brief glimpses of the Japanese army’s purpose.

Still, in no one year were the exports of horses to Japan from any one country large enough to appear as a separate item in the usual published reports, until the fiscal year 1936–37. This implies that in no one case did such exports exceed \$250,000 in value. Then Ireland suddenly reported the exportation of some 3000 horses valued at about \$3,000,000—an average price of nearly \$1000 each. The next year, 1937–38, she exported 13,000 horses to Japan, valued at \$7,000,000. Not one word about any of these transactions appears in any Japanese report. The only conclusion that can be drawn from these facts is that the Japanese army, on the eve of its attack on China, decided that the Irish hunter was the type best suited to its needs that could be purchased in quantity, and it bought all it could and at a very stiff price.

In the meantime the war with China had begun. Men from the quartermaster corps scoured the country with long stake lines looped over one shoulder. One would stop at a carter’s house, and when he left the carter’s horse would be trailing behind him. When he returned to the local remount station that night, every lead on his long stake line would be snapped to the halter of some carter’s horse. Many Americans who have since returned home report seeing long strings of horses being led along Japan’s streets and highways by soldiers.

The race course, together with imports of horses of the Thoroughbred type, furnished the Japanese army with mounts for its officer personnel and certain selected units. The carters furnished its transport animals. Within a year the army had requisitioned every sound horse of the proper age. There is no doubt that Japanese losses in transport animals and saddle stock have decreased both the quantity and particularly the quality of the horses.

For transport animals the invasion armies were forced to use what they could seize in the occupied countries. Usually these animals were cattle and water buffalo rather than horses.

That there was an increasing need for transport horses at home after the all-out war against the United States and Britain began is obvious. Japan has always lacked adequate railroad and motor truck transportation, and military necessity has increased that lack. She may have had twice the number of horses necessary for her peculiar economic setup in peace time—the army's long-time under-cover program arranged for that. But she still has too few horses to meet the needs of an all-out war, even if there were no losses.

As Japan will no longer be a military power, the local horse production will shrink despite the absence of war losses and the horse population will probably be maintained at about 600,000 head in the future. However, horse racing in Japan has such a wide following among all classes that it will continue to be of great importance, in that racing and race-horse production will absorb a greater share of the national income than in the United States, possibly almost as much as in Australia.

**Swine.** Unlike the Chinese, the Japanese never have been pork eaters and the waste quotient of Japanese agriculture is so small that it provides little opportunity for hog raising as a by-product. The total swine population averaged about a million head for the five years immediately preceding the war, only 2 per cent of that of the United States for that period, but twice Japan's own average for 1920-30.

Foreigners in Japan and the Japanese who have acquired foreign dietary habits constitute the only outlet for pork products. The principal market is Yokohama and most of the production is in that vicinity.

**Sheep.** Though there is a large demand for wool (300 million pounds) on the part of the Japanese textile trade, there were only

about 70,000 sheep in all of Japan proper prior to the war. The government sponsored the production of sheep in Kyushu many years ago, but the effort failed because of the prevalence of parasites. The small present production is carried on in northern Honshu and in Hokkaido. It has not expanded because the animals can be grazed only about half the year. Barn-feeding during the long period that snow lies deep on the ground makes sheep raising uneconomical. Japan cannot compete with China in the production of low-grade wool (carpet wool) or with Australia in fine wools.

**Poultry.** While the Japanese peasant never has enough waste on his tiny farm to support a hog, there often is enough to support a few hens. As both eggs and chickens are important articles in the diet of the more prosperous Japanese, there has been a considerable localized traffic in these commodities since ancient times. Apparently there was no early effort to develop breeders that would be high egg producers, but much effort was expended in evolving ornamental types, the most famous being the long-tailed cocks whose tail feathers may be from eight to fifteen feet long when they are carefully tended. These and several other breeds acquired a highly artificial value as pets and objects of display.

The development of utilitarian breeds came at the same time that modern methods of poultry culture were introduced from America late in the past century and a considerable industry developed, particularly around the city of Nagoya. The history of this development parallels that of all the others in Japan. At first foreign incubators, brooders, and other equipment were imported, as well as eggs from hens of high yield strains. Foreign methods were studied and imitated as closely as possible at first, and then tentative and at last bolder experiments were made to adapt those methods to local conditions. Considerable effort was expended in producing superior egg-laying strains from native Japanese breeds, but it is impossible to determine how successful they were from native reports because the latter are so clouded with the curious mixture of boasting and subterfuge that is characteristically Japanese.

There is plenty of evidence that some of the modern hatcheries and brooding establishments were large and efficiently operated. The commercial yearbook of the *Japan Times* for 1938 states that one long-established firm near Nagoya has an incubator capacity of nearly half a million eggs. Large but unspecified exports of fresh

eggs were claimed, especially to the big port cities in the Far East --Manila, Shanghai, etc. This, in addition to satisfying the large and growing domestic demand for eggs and poultry.

As with every other Japanese industry, the poultry business was given continual assistance by government-sponsored scientists. In 1925 a veterinarian, Dr. Kiyoshi Masui, and two laboratory assistants, Juro Hashimoto and Isamu Ono, working in an experimental station of the ministry of agriculture and forestry, discovered a practical method of determining the sex of day-old chicks. This was announced by Dr. Masui in 1928 at the convention of poultry science in Ottawa and has since had a profound effect on poultry breeding throughout the world. Hatcheries supplying day-old chicks to egg producers can now guarantee the purchasers that 90 per cent or better of the chicks will be pullets. Japan sent several score trained chick-sexers abroad after 1933 and several of them were working at the larger hatcheries in the United States when the war broke out.

This method of chick-sexing gave a great impetus to egg production in Japan. Indications are that the Japanese do very well at modern poultry husbandry. Since this industry requires a small amount of land per producing unit and a large amount of painstaking, fairly skillful, but not very arduous labor, it should be well suited to conditions in Japan.

## V.

# Mining

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*Japan was first known to Europeans as a land fabulously rich in minerals of all kinds, particularly gold. There is considerable historic evidence that this gold found its way into China through Korea very early. Certainly the Mongol emperors of China had Japanese gold in mind when they contemplated various attacks on the islands, most of which never got beyond that stage and none of which was successful. Some Japanese copper and silver reached China, and some iron, principally in the form of sword blades. Japan made great technical strides in steel making in the Middle Ages; the blades she produced were superior in every way to any made elsewhere in Asia or in Europe at that time.*

Both the Portuguese and the Dutch were lured to Japan by stories of her abundant supplies of gold. For some time after the Europeans arrived, silver was relatively dear; this made it profitable to bring it in from the Americas to trade for the Japanese gold. Thus silver was Japan's first mineral import.

Later the gold-silver ratio became equalized to something like that prevailing in contemporary Europe and during the long period of seclusion comparatively large amounts of silver as well as gold and copper were exported by the Dutch. The Chinese, who shared the monopoly of Japanese trade with the Dutch, continued to buy steel blades.

In the period following the Tokugawa era and the so-called "restoration" of the Mikado, Japan continued to be an exporter of minerals. Foreign steamers began to fill their bunkers with Japanese coal. Just as the Dutch sent experts to Japan to teach improved methods of mining metals, the English, Americans, and Germans taught the Japanese improved methods of coal mining. The United States maintained a coaling station for her Asiatic fleet at Nagasaki and was influential in developing the coal mines on the island of Kyushu.

By 1900 the Japanese were exporting considerable quantities of bunker coal to the South Seas in their own ships. This trade contin-

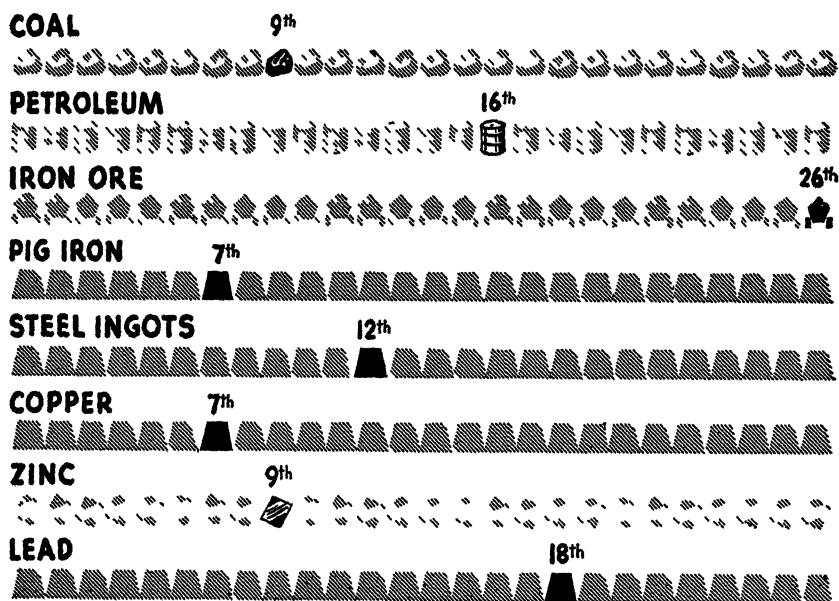
ued until the demand fell off sharply because coal was supplanted by fuel oil in the boiler rooms of most vessels.

Japan remained an exporter of minerals until well into the twentieth century. In other words, she had an exportable surplus of minerals as long as she was content to support herself by agriculture and light industries. But her domestic mineral resources were not

## JAPAN'S RELATIVE POSITION AMONG COMPETITORS IN THE PRODUCTION OF MINERALS AND MINERAL PRODUCTS

ESTIMATED FOR PREWAR YEARS

BLACK SYMBOLS ARE JAPAN



sufficient to support the heavy industries that began to develop extensively during the First World War, and they were far from adequate for her program of military expansion that began to accelerate after her conquest of Manchuria in 1931 and assumed enormous proportions after her attempt to conquer China proper in 1937.

During the depression that followed World War I, Japanese periodicals cried loudly that Japan could not find a suitable export mar-

ket for her surplus minerals, particularly coal. Within ten years the same periodicals were decrying the fact that she was "deprived of proper import sources" for these same minerals.

Of course any contention that Japan was deprived of any such resources is nonsense. She would never have felt thus deprived if she had not been so intent on military expansion. Her inordinate demand for minerals during the ten years prior to World War II was largely for war stocks. She could have filled economically by trade all her requirements for metals for any possible peacetime expansion of her heavy industries, because her geographic situation gives her ample access to all sources of supply.

Military necessity, not economic need, dictated that Japan have physical control of as many mineral sources as possible. Many of them were extremely uneconomical to develop. Mines were operated, both at home and in Manchuria, at a cost out of all proportion to their production. Japan's whole economic structure was overbalanced by her efforts to procure and store up minerals for war.

**Coal.** Coal represented between 60 and 70 per cent of all of Japan's mineral production during the period preceding 1937. In that year 40,887,000 metric tons<sup>1</sup> were mined in Japan proper. This is in contrast to the 445 million tons mined in the United States and the 230 million mined in Great Britain and Germany that year. Though there are no satisfactory data on Japanese production for any year thereafter, it is probable that *domestic* production has declined steadily during the war and that it will never again attain the 1937 level, which was one million tons under the all-time peak reached in 1936.

There are several reasons for this. (1) The coal reserves in the main islands are only 16,000,000,000 tons, according to a Japanese estimate made in 1932, a period when all Japanese estimates of their resources were exceedingly optimistic, or 8,000,000,000 tons, according to a survey made by foreign engineers in 1907. (2) To attain the 1936 peak, the Japanese had to operate many uneconomic mines, some extremely deep and others with coal seams only a few inches thick. (3) The man-power situation began to deteriorate shortly after the war with China started, and it became increasingly acute. When north China and then Indo-China came completely under Japanese domination it was both cheaper and more feasible from a military standpoint to import coal from those sources than continue

<sup>1</sup> A metric ton is slightly less than a long ton.

to operate domestic mines at such a huge cost in man-hours. (4) With no war machine to feed, Japan's future domestic consumption of coal is of course hardly likely to reach the 40-million-ton level of 1937. The 1922-32 level was about 31 million tons.

In 1937 only 4,426,000 tons of coal were imported to Japan from foreign sources, about 2 million came from her possessions and dependencies. The same year nearly 2 million tons were exported, half of it to overseas possessions. This indicates that the domestic supply met more than 90 per cent of an abnormally large domestic demand. However, as indicated above, much of this production, perhaps half, was uneconomic and could not compete in a free economy. As early as 1930 Japanese periodicals complained that foreign coal could be laid down in the ports of Kobe and Yokohama for less than it cost to bring it out of the pits in many mines.

Another consideration, Japan is seriously lacking in both anthracite and good coking coal. The great bulk of her production is low-grade bituminous.

According to the 1938 commercial yearbook issued by the *Japan Times*, the 1936 consumption of coal was divided as follows:

Heavy industry .. .	7,497,000 tons, or 17.1%
Chemical industry .. .	5,690,000 tons, or 13.0%
Shipping .. .	4,530,000 tons, or 10.3%
Railways .. .	4,028,000 tons, or 9.2%
Textile industry. . . .	3,836,000 tons, or 8.7%
Ceramics .. .	3,822,000 tons, or 8.7%
Electric power. . . .	3,175,000 tons, or 7.2%
Gas and coke .. . . .	2,433,000 tons, or 5.5%
Provisions (including canning). . .	2,231,000 tons, or 5.1%
Others... ..	6,609,000 tons, or 15.1%

These figures show clearly that the great bulk of Japanese coal that year was consumed by war industries and by the industries that produced principally for foreign trade.

Coal is found quite extensively throughout Japan, but most of the producing mines are in the northern half of Kyushu, centering around the ports of Moji and Yawata; in the adjacent western tip of Honshu, in the smaller island of Shikoku, in the Ibaraki district north of Tokyo—Japan's small supply of anthracite comes from here—and on the northern island, Hokkaido, where there are some



newer and better mines. Other mines are located in Sakhalin, but they will undoubtedly revert to Russia.

Prior to January, 1943, nearly all the coal mines in Japan were owned or controlled by one or another of the Big Eight—Mitsui, Mitsubishi, Sumitomo, etc.—but the government probably took possession of these properties at that time.

**Copper.** Copper is found in all of Japan's main islands. At the beginning of the war, most of the production was in the hands of five firms—the Nippon, Mitsubishi, Sumitomo, Furukawa, and the Fujita mining companies. Together they formed a marketing and price-fixing combine called the Suiyokai. The entire industry was probably expropriated by the Tojo government in January, 1943.

In 1917, under the influence of mounting prices, Japan produced 108,000 metric tons of copper, of which 72,000 were exported. Whether this production peak was reached again during World War II is rather doubtful because nearly all the mines have been worked for years—some of them for centuries—and have for some time been working with ore that lies at great depths or that presents other technical difficulties. After 1920 American copper could be sold at a profit on the Japanese market cheaper than the metal could be mined and smelted in Japan, consequently in 1922 an import tariff of 7 yen per 100 pounds was levied to keep the home mines in operation. Thereafter Japanese copper mining had to be supported by tariffs and subsidies of various kinds, in spite of the fact that mining and processing methods had been extensively improved with the help of American engineers.

In 1936, the last year for which there are reliable data, domestic production was about 80,000 tons. It undoubtedly increased during the war, for war is a great consumer of copper and its demands never take production costs into consideration.

Japan became an importer of copper for the first time after the conquest of Manchuria when the army began to insist on the accumulation of military stock piles. Her copper imports exceeded 200 million pounds in 1937. But as late as 1933 the *Japan Times Yearbook* said: "We are self-sufficient in coal, copper, pyrites and sulphur. . . ." This self-sufficiency could be maintained only by subsidies, however. Under a system of free economy most of Japan's copper mines could not compete with the richer mines in the Americas and Africa.

**Gold.** In value the average annual production of gold exceeds that of copper and is exceeded by no other mineral but coal. Japan's coal output in 1936 was valued at 305 million yen; gold, at about 75 million, and copper, at a little over 66 million.

About 70 per cent of the country's gold output in recent years has been a by-product of the copper industry, for there is some gold in nearly all the copper ore found in the islands. This is one of the reasons why copper mining has been consistently supported by some form of government subsidy. The government has been chronically in need of gold to support its currency and to finance imports of critical materials for military or industrial demands.

Some placer mining is still carried on in Japan; most of it consists of working over the beds which furnished the tons of gold that flowed out of the country in ancient and medieval times. Some modern equipment is used, but most of the work is done by impoverished men who glean the gold from the sand, speck by speck.

Japan's gold production will not be significant under a system that permits the free flow of goods.

**Iron Pyrites.** Pyrites and other iron sulphides ranked first in bulk and fourth in value among Japan's mineral products. The 1926-30 average production was only about half a billion tons. About 2 billion tons were dug in 1937 and production has been mounting steadily. The value of this product is very low. The 1½ billion tons mined in 1936 were worth only 19 million yen.

Iron pyrites is the principal source of supply for Japan's huge sulphuric acid and ammonium sulphide industry, though some of each is turned out as a by-product by the Sumitomo copper smelters. Great quantities of sulphuric acid are consumed by the rayon and munitions industries, and large amounts of ammonium sulphide were used as fertilizer in peacetime. Iron pyrites itself is a good soil conditioner and has been widely used for this purpose in Japan.

Pyrites is a poor source of metallic iron because of certain processing difficulties. Japanese publications have for years been periodically announcing the discovery of revolutionary methods for salvaging the metallic content in iron sulphides, but there is no indication of their extensive use prior to the war.

Japan's poverty in the types of iron ores that can be readily and cheaply reduced to metal has always been a source of concern and bitterness. Magnetite and magnetic iron sands seem to have been the chief sources of raw material for the famous sword blades of

the Middle Ages, but the supply, although widely distributed, was limited. Iron oxides have been mined in the Iwate district since 1823, but data on output and reserves are not obtainable. Both are admittedly small.

In 1917, 2,384,000 *kans* of chrome iron ore were produced from the Shimane and Nitto mine fields, but their output dropped sharply after that. For many years thereafter no production was recorded. Hence it is probable that these mines are uneconomic and cannot be operated in time of peace.

A detailed description of iron and steel operations is given in the chapter on manufacturing, but it may be stated here that approximately two-thirds of the steel end products required by Japan in peacetime are derived from imports of ore, pig iron, scrap iron, scrap steel, and steel ingots.

**Petroleum.** Crude oil is Japan's fifth mineral product by value. Production is small, about 2½ million barrels in 1936—something less than one-sixteenth of her domestic requirements for that year. According to oral reports that cannot be confirmed by any documentary source, until the outbreak of the war in Europe in 1939 the Japanese made frantic efforts to increase the home production without great success. Thereafter these efforts ceased and plans were completed to seize production sources in the East Indies.

Japanese wells are in small fields, most of them on the western side of the northern extension of Honshu, and on Hokkaido. The wells, most of them quite shallow, are all small producers, and the oil is heavy and of low grade. All of the islands have been thoroughly prospected for other deposits of oil, first by foreign geologists and then by Japanese in the employ of the government, the Imperial University, and one or another of the big companies, but none has been found.

Japan's oil production will doubtless continue to be a minor factor in her economy.

**Silver.** Over 9½ million ounces of silver, valued at 15 million yen, were produced in Japan in 1936. Silver is entirely a by-product; it is found in the same ore with gold, copper, or lead, but never in sufficient quantities to make it worth processing for silver alone.

**Zinc.** Zinc production rose from the 1926–30 average of 20 million metric tons to about 40 million in 1936 and a probable 50 million in 1937. Here again is expansion that indicates uneconomic production for military purposes. However, little is published about actual

conditions in the industry and to what extent it was subsidized, but it is known that import duties were drastically increased after the First World War to protect domestic production. Unsubsidized peacetime production will probably be small.

**Sulphur.** Sulphur is one of the minerals of which Japan normally has a surplus for export. Production in 1939 was 198 million tons valued at nearly 12 million yen, a great increase over the 61-million-ton average for 1926–30. Post-war production will be governed by the world price but may approach the 1931–35 average of over 100 million tons. Reserves are apparently ample and the industry seems to be sound.

**Lead.** Production of lead is relatively small—a little less than 9 million tons in 1936. The 1931–35 average was 6 million tons. Nearly all the lead is produced as a by-product of silver, copper, or gold, only three small mines being operated for their lead alone. Production centers are Kamioka in Gifu prefecture, and Takata in Iwate.

**Aluminum.** No metallic aluminum was produced in Japan until 1934, when 664 metric tons were processed from imported bauxite. This was increased to 4434 tons in 1935 and to 6664 in 1936. Thereafter no production figures were issued, but the trend is obvious. Japan's production of aluminum grew in proportion to her production of military airplanes. Imports of metallic aluminum declined from 14,000 tons in 1935 to 11,000 in 1936.

Most of the bauxite used in the new Japanese refineries was imported, largely from Japanese-controlled territory in Asia, but newspaper and magazine articles hint that some sources have been developed in Japan proper. In 1939 reports were current in various Japanese publications that a process had been developed to produce aluminum economically from some material, other than bauxite, "of which there are billions of tons in Japan and Korea." This, of course, is important if true, it might mean the development of a great new industry in both countries after the war.

The largest producer of aluminum in Japan proper is the Sumitomo company, whose refinery is at Niihama on the north shore of Shikoku, where the Sumitomo copper refinery is located.

**Manganese.** Japan produces an unspecified amount of manganese ore; in 1934, 46,526 tons of the metal were produced. Centers of production are at Mirika on Hokkaido, at Karakisawa in Nagano prefecture, at Iwasaki in Aomori prefecture, and at Searashi, Ishikawa pre-

fecture; here bean-shaped pebbles of manganese are dug out of Tertiary formations.<sup>2</sup>

**Magnesium.** For several years Japan has produced magnesium carbonate from sea water in small plants in secluded bays along the north shore of the Inland Sea. According to oral reports not yet confirmed, one or more of these plants was equipped to make metallic magnesium in 1940. The extent of this production is not known; however, it is not likely to be large nor will it be efficient enough to compete with American production.

**Other Minerals.** There is an unspecified production of tin in Japan proper, with fairly large mines at Akenobu in Hyogo prefecture and Mitate in Miyazaki prefecture, and smaller ones elsewhere on Honshu. Bismuth and mercury are both mined in small amounts; the annual production of each does not exceed a few tons.

Several kinds of sand used in Japan's exceedingly important glass industry are also produced in large quantities, as well as many various clays which are used for an amazing variety of ceramic products, from teacups to mailboxes and transformer cases. The quarrying of limestone and other rock likewise became an important industry during the last few years of peace, particularly since the recent development of cement manufacture.

Japan's production of some fifty minor minerals, including gems, is mentioned in a few reports but is altogether too small to have any bearing on her future economic situation.

It may be interesting to note Japan's relative position in the production of the commoner commercial minerals and their products during the pre-war years. She was 9th in coal, 16th in petroleum (although her output is only one-tenth of one per cent of the world total), 26th in iron ore, 7th in pig iron, 12th in steel ingots, 7th in copper (5 per cent of the total), 9th in zinc, and 18th in lead. Her relative position in most if not all of these categories will decline under a system of free economy.

<sup>2</sup> Data from *Japan-Manchukuo Yearbook*, 1935-36.

## VI.

# Transportation

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*On the day her navy attacked Hawaii, Japan had a modern and efficiently operated merchant marine adequate to handle her large overseas commerce, the extensive carrying trade upon which she depended for a large part of her national income, and her vital inter-island communications. Her railway trackage was small for a populous industrial nation, but well maintained. Her railway equipment was modern and fairly adequate. Her highway system was underdeveloped, chiefly because of the small amount of motor transport, except for military vehicles. Air transport, a recent development, had grown surprisingly, almost entirely because of military support.*

**Merchant Marine.** At this writing we have to speak of Japan's marine transport in the past tense because we do not know how much of it has been sunk and how much permanently disabled. The tonnage lying half-wrecked in various harbors throughout the Far East is immense. Some of it has been damaged by bombs, shells, or torpedoes, some of it is worn out from the continuous operation necessitated by the fact that Japan has to maintain extensive supply lines with a rapidly decreasing number of ships and inadequate and overcrowded servicing and repairing facilities.

According to the July 1, 1939, figures supplied by Lloyd's Register, Japan had 2225 ships of all classes (excluding naval vessels) that exceeded 100 gross tons, or a total of 5,629,845 gross tons.<sup>1</sup> This

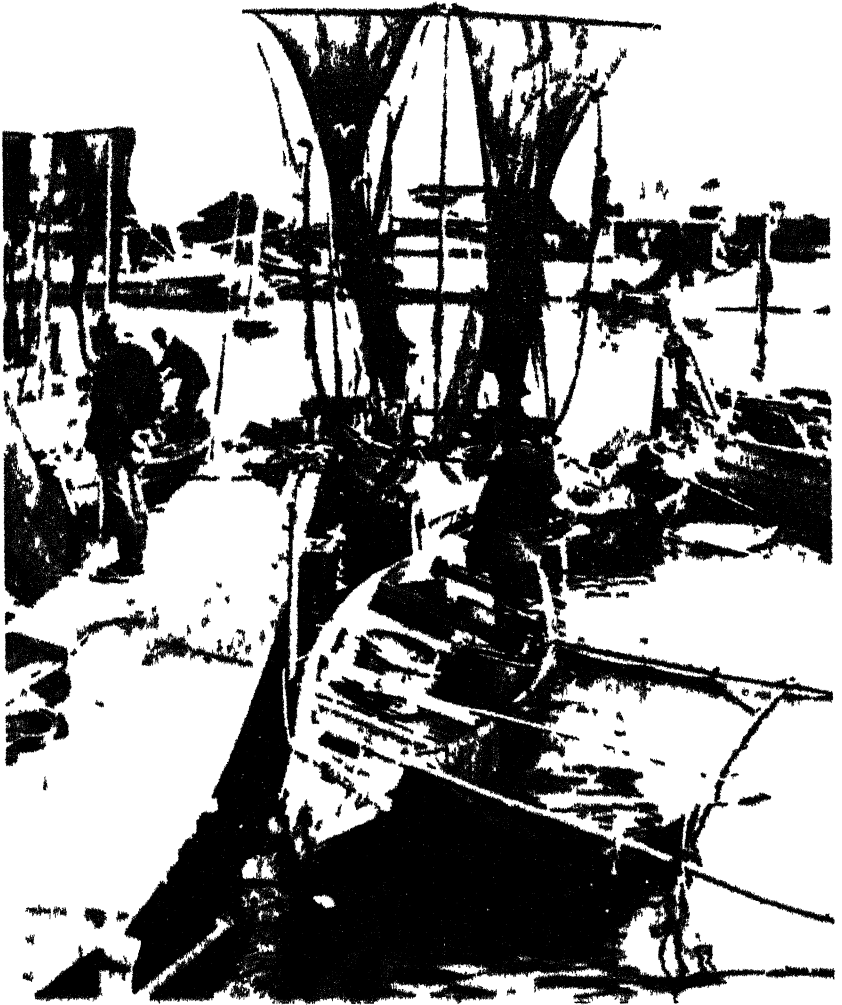
<sup>1</sup> The gross tonnage of a vessel is the total covered space of the ship (with a few reductions specified by international law) expressed in units of 100 cubic feet each. The net tonnage is the total covered space suitable for passengers or cargo, fuel, units of 100 cubic feet. The dead-weight capacity is the weight of cargo, fuel, passengers, provisions, and the like, expressed in metric or long tons of weight, that is required to bring the vessel to its Plimsoll or water line. Gross and net refer to *space*; dead-weight and displacement (for naval craft) refer to *weight*. The figures representing dead-weight and displacement tonnage are greater than those representing gross or net tonnage. For cargo ships a vessel of 4000 net will have 6000 gross tons and a dead-weight capacity of 10,000. These proportions vary with the type of ship and are not fully applicable to giant passenger craft or to tank ships and ore boats.



Village of Japanese offshore fishermen (*International News.*)

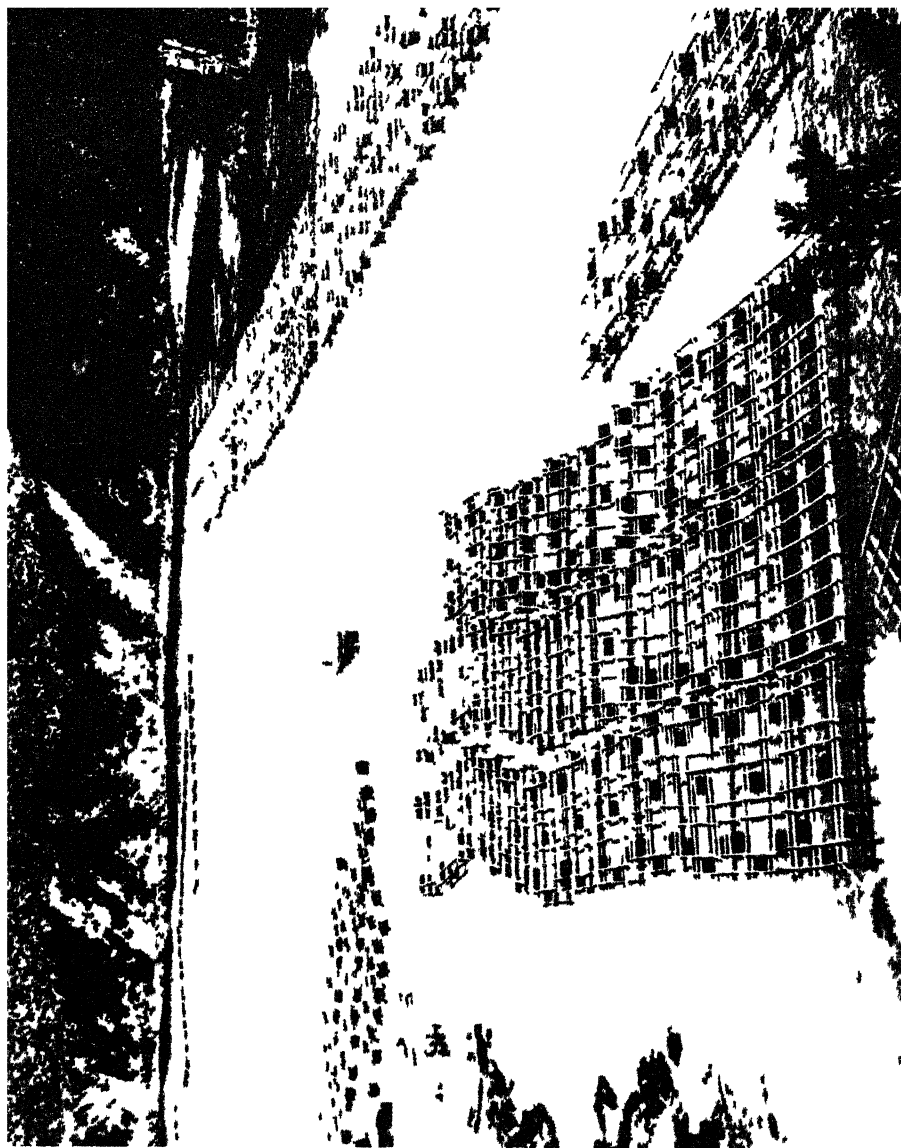
Drying sardines—an offshore catch. (*Wide World.*)



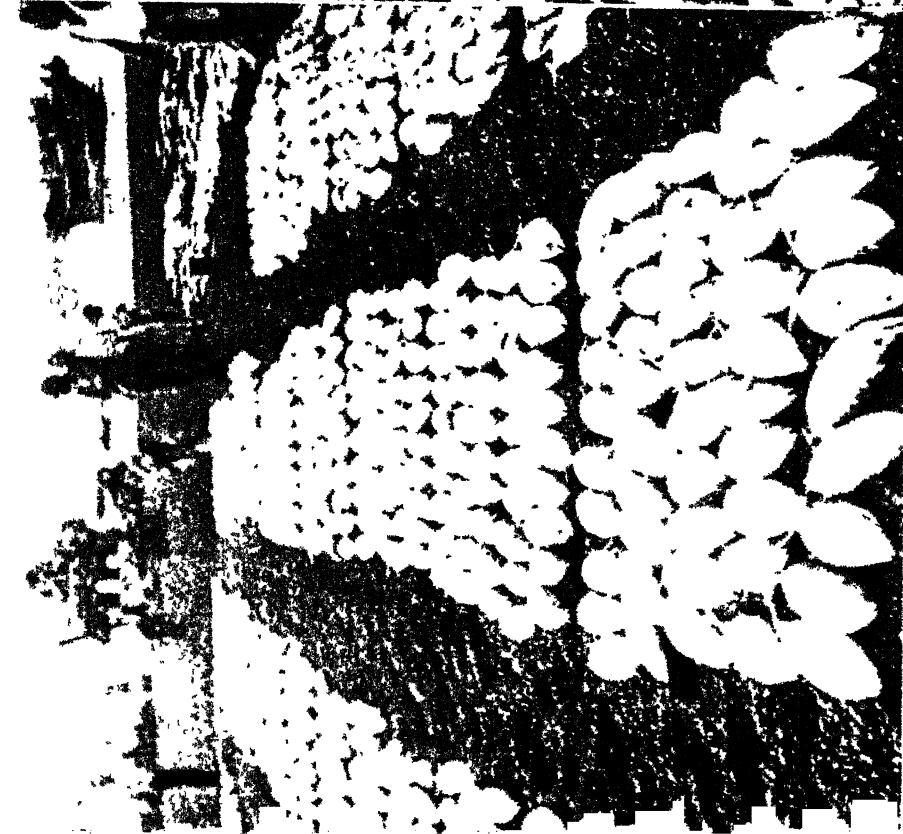


Special area fishermen, Tokyo Bay (*Press Association*)

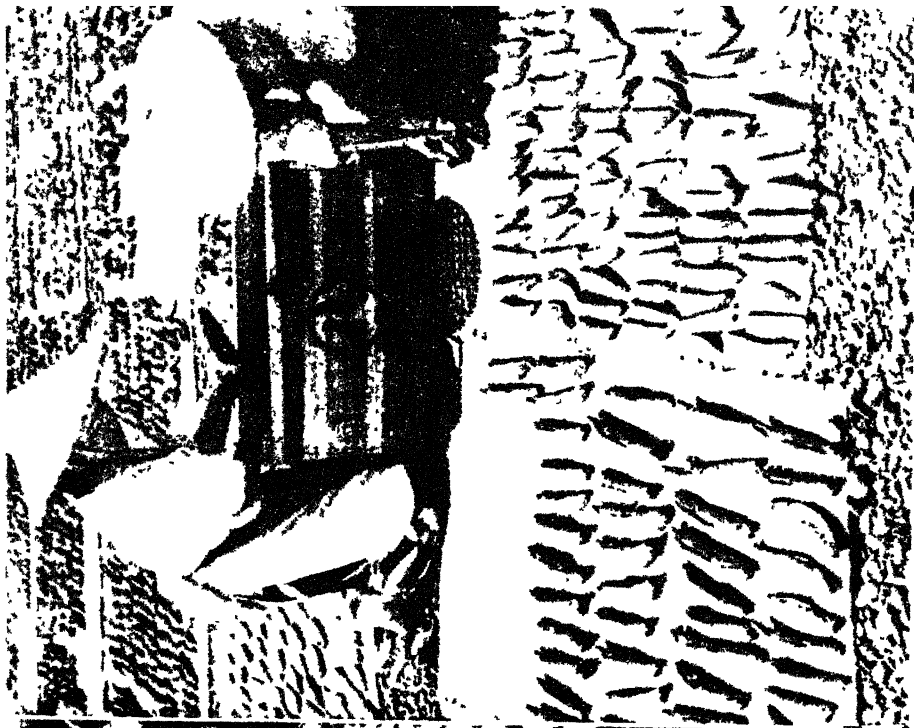




A Mikimoto pearl culture project near Toba, Japan. The Japanese farm their coastal waters as carefully as they farm their land. Pearls are only one of many kinds of marine products propagated. Others—seaweeds, fish, shellfish, and crustaceans—are for food. (*Wide World*)



Bonita on the beach, lined up for sale. (Nippon XXIV, 1940 )



Women drying bonita by the complicated Japanese  
(Nippon XXIV, 1940 )



Deep-sea fishing—a salmon catch (East Asia Economic News )

Conveyor carrying salmon to the cannery. (*International News* )





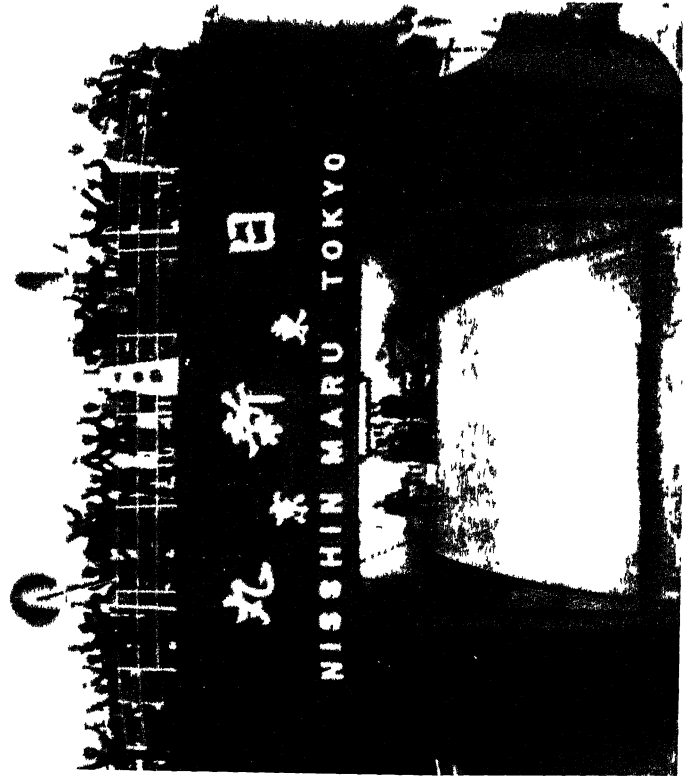
Pressure cookers in a salmon cannery (*International News*)



Cummg sadnes in oil (Wide World)



Leather by-products of the fishing industry. (Osaka Manichi

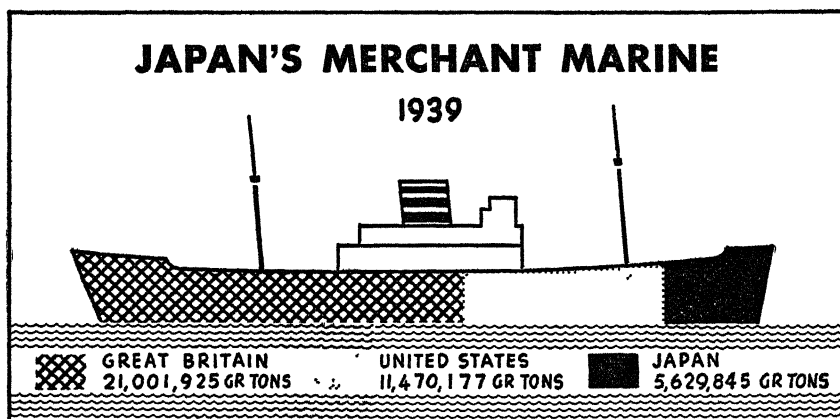


丸新日  
NISSHIN MARU TOKYO

Whaling factory-ship. (Far Eastern Trade, New York.)

total was exceeded only by Great Britain and the United States. Reports of the Japanese Shipping Control Bureau show that 39 ships totaling 106,000 tons had been laid down by August, 1940, and probably another 150,000 tons were in service by December, 1940. This indicates that Japan entered the war with about 5,885,000 gross tons of merchant shipping.

Japan has always needed about 1 million tons of shipping to handle her normal peacetime inter-island and coastal trade. This was inordinately heavy because the numerous small ports along



her entire coast line make every locality accessible to water transport; furthermore, it is of course much cheaper than rail transport. Another 2½ million tons was normally engaged in traffic between Japanese ports and those on the immediately adjacent coast of Asia—China, Korea, Manchuria, and to a lesser extent the island of Sakhalin and the Siberian maritime provinces. This left some 2 million tons that were engaged in worldwide or at least long-voyage traffic.

In the latter class Japan went in extensively for fewer, faster, and better ships during the decade of rapid expansion prior to the war. Her older and slower vessels were relegated to inter-island and China coast routes; new ships, most of them powered by Diesel motors, and faster, more reliable, and vastly more economical than the majority of those flying any other flag, were put on the deep-sea routes. Two of the "round-the-world" lines operating in 1940 were Japanese. Japanese lines held a major position in the traffic lanes of all the oceans but the North Atlantic.

All these new ships were built in Japanese yards, the majority by Mitsubishi and Kawasaki subsidiaries. They were powered with Japanese-made motors and engines, only occasional fittings and certain precision instruments had to be imported. The ships might shortly have come to dominate the world's deep-sea traffic if Japan had remained at peace. But Japan chose war. The result was that most of these new, swift vessels have been destroyed or disabled.

For example, the N.Y.K. line (the Nippon Yusen Kaisha, a Mitsubishi subsidiary that had 149 ships of over a million gross tons in operation) placed three ships—the *Nitta Maru*, the *Yawata Maru*, and the *Kasuga Maru*—in service late in 1940 and announced that they were the first of nine vessels of the *Yawata* class, to be completed by the end of 1943. They were about 17,000 tons and had a speed of 22½ knots. Four ships of this class were sunk by the United States navy in the first year of the war; one of them had been converted into an aircraft carrier. It is doubtful whether any more were completed, except possibly one or two as auxiliary aircraft carriers, because of the navy's excessive demands on Japan's shipbuilding facilities and the shortage of steel. This is also probably true of the 28,000-ton N.Y.K. liners, the *Kasiwara Maru* and the *Izumo Maru*, and the four 11,400-ton freight-and-passenger vessels, all to be completed in 1942 or 1943.

Similarly, the O.S.K. line (the Osaka Shosen Kaisha, with 180 ships totaling 750,000 tons) put two 13,000-ton, 22-knot ships, the *Argentina Maru* and the *Brazil Maru*, into world-cruise service shortly before the beginning of the war. Both have been reported sunk.

Nothing is definitely known of the fate of three more vessels of this class that were to be launched in 1943. The "K" line—a Kawasaki subsidiary—lost nearly all of its larger ships, and smaller lines suffered proportionate losses in the same category.

The huge increase in Japanese shipping between 1918 and 1941 was due in part to a government program of indirect subsidization and in part to the low initial cost made possible by a small overhead and cheap labor. Production costs were about 55 per cent of those in the United States and about two-thirds of those in Great Britain and Germany. Thus a cargo vessel that cost \$1,000,000 to build and equip in an American yard, or \$660,000 in Great Britain, could be turned out by Mitsubishi for \$550,000.

But the basic advantages to the Japanese owner did not lie solely



in the \$450,000 price differential in his favor. He financed his investment with money procured at 1½ per cent annual interest through a government-sponsored loan, and he paid no more than 4 per cent for hull insurance, as opposed to 5½ per cent in western countries. Hence, in its twelve or fifteen years of first-class service, a Japanese freighter carried a fixed cost of about half of that of an American ship of comparable size, and was operated at a much lower cost; operating differentials, however, were not so important as the overhead cost.

In considering the future of Japan's shipping transportation, three things must be borne in mind:

1. Japan needs a minimum of 3 million tons for inter-island and China coast traffic if her people are to continue to make a living. The war will probably leave her with something less than this amount.

2. The Japanese have received a considerable share of their income from sea carriage—carrying the goods of other nations from one foreign port to another. Either they must be allowed to continue with some part of this trade, or they must be given some other field of endeavor to compensate for its loss.

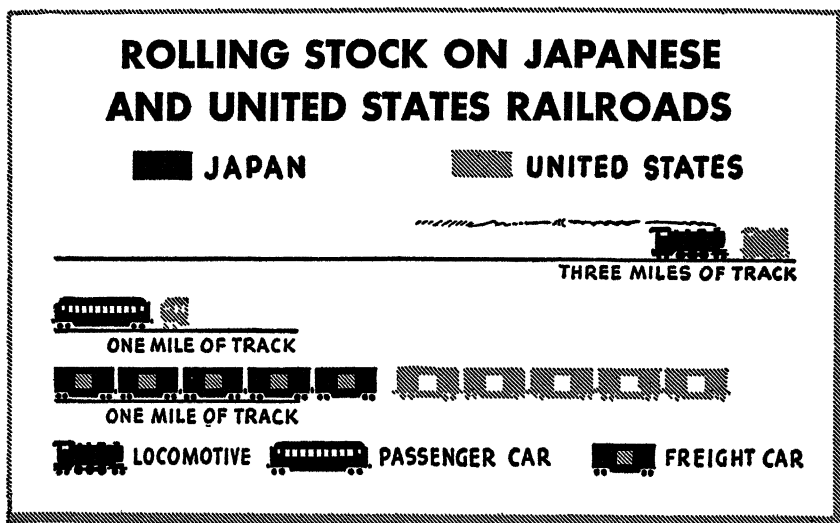
3. If Japan is permitted to build ships to replace the tonnage lost during the war and bring it up to the minimum necessary for her self-maintenance, it is obvious that certain limits and restrictions will have to be imposed. Certainly all government subsidies, direct or indirect, should be stopped, because her shipyards are going concerns, many of them with their operating equipment and material stocks intact. They made a net profit of 15 to 25 per cent in peacetime and they do not need subsidies to compete on more than an even basis with shipyards in other countries.

A definite limit in size should be included in the restrictions. Probably the best way to insure against subterfuge is to put a limit on the over-all length—perhaps 100 meters. Any attempt to increase the tonnage of a vessel of a specified length by increasing the draft or beam defeats its purpose by reducing speed and impairing docking facilities. A limit on speed should be included to prevent over-favorable competition with the standardized freighters built in great numbers by the United States and Britain during the war.

**Railways.** According to the latest available figures, Japan has about 10,740 miles of government-owned main-line trackage, and some 4000 miles of privately owned subsidiary lines, most of them nar-

row gauge. This is about twice the mileage in use in the state of California, which has about the same inhabited area but only one-tenth of the population of Japan. This comparison is not valid unless consideration is given to the fact that California has a great network of high-speed highways that carry a large volume of truck and passenger car traffic. Japan's highways are inadequate and her motor car traffic is exceedingly limited, as will be brought out later.

Japan's rail lines were well maintained and her equipment was excellent prior to the inevitable wartime deterioration. This de-



terioration was due not only to the fact that rolling stock ceased to be replaced and line maintenance was reduced below a safe minimum, but to the overloading of all facilities after the serious shipping losses in the first ten months of the war. For example, an imperial decree issued in October, 1942, ordered all the coal and steel from the important mining and processing area around Moji and Yawata on the Shimonoseki Straits to be transported by rail to the great industrial cities of Kobe and Osaka. Hitherto all traffic in heavy goods between these points had been carried by ship through the Inland Sea. There is only one rail line between the Shimonoseki area and Kobe, and this traverses difficult terrain along the north shore of the Inland Sea. There are a thousand bridges and trestles and scores of tunnels, in addition, there are a great number of cuts that are chronic landslide areas during wet weather in spite of ex-

tensive terracing and cement coatings applied to the cut banks. Hence the maintenance of this line under a wartime overload was exceeding difficult and considerable deterioration unquestionably resulted.

Normally in Japan the passenger load on all her rail lines was heavier than the freight load. There was one locomotive to each three miles of track, and one passenger car and five freight cars to each mile. The locomotive and passenger car ratio exceeded that in the United States; the freight car ratio was about the same. But our total freight car capacity is much greater and our ton-mile total is vastly larger. In Japan the gross annual receipts from passenger traffic exceeded those from freight (passenger traffic, \$90,000,000; freight, \$60,000,000)—one of the few cases in the world where this condition prevailed. Much of the passenger mileage was commutation traffic; the average passenger haul was only 11 miles. During the war this was cut to the irreducible minimum to increase the peacetime freight haul of 700 tons per mile per year. Even so, the necessity of moving thousands of troops and war workers must have limited the reduction and led to considerable overworking of the available facilities.

The Japanese have shown spectacular efficiency and organization in many phases of railroad operation and maintenance. For example, about thirty years ago air brakes were installed on all main-line equipment. Once this improvement was decided upon by the officials of the Imperial Railroad Bureau, it was carried out like a military operation in a manner that vividly illustrates the Japanese genius for detailed planning and the rapid execution of plans once they are formulated. In this case facilities for the installations were set up at repair depots all along the lines, all the equipment was brought in, the brakes were installed, and the equipment was back in service at the end of twenty-four hours. The American method of piecemeal installation would not have resulted in even a one-day stoppage of service; nevertheless, the Japanese method was certainly a spectacular demonstration of their own kind of efficiency.

Less spectacular has been the program for changing the majority of the rail lines from narrow gauge to standard gauge; this required several years because of material shortages and technical difficulties. The fact that some of Japan's more important traffic arteries were still narrow gauge at the last report further indicates that there must have been serious freight-handling problems during the war.

A long-time program for the complete electrification of the rail lines was inaugurated several years ago. When the war broke out the important Tokyo-Nagoya-Osaka-Kobe line had been electrified, as well as most of the auxiliary trackage immediately adjacent to Tokyo and much of that in the Osaka-Kyoto-Kobe industrial triangle. This was part of the wider program for developing Japan's extensive hydroelectric potential, it involved extensive dam and powerhouse construction and was already well along when it was cut short or vastly curtailed by the war.

Still another important development was the completion in 1933 of a seven-mile railway tunnel under Shimonoseki Straits, between the cities of Shimonoseki on Honshu and Moji on Kyushu; this permitted a free flow of traffic between the Kyushu rail system and the main island. Ferries still bridge the narrow water gaps between Kyushu and Shikoku, Shikoku and Honshu, and Honshu and Hokkaido.

No substantial increase in railway trackage is indicated for post-war Japan. Rehabilitation of equipment will of course be necessary, it should proceed at a pace that is in keeping with the rehabilitation of the rest of her industrial and commercial structure. Owing to the depletion of the coal reserves and the abundant sources of hydroelectric power in Japan, it would probably be economical to electrify all of the main traffic arteries, if indeed this has not already been done as a wartime measure.

There is no doubt that with the establishment of a normal peacetime economy the great bulk of Japanese freight will again be transported on coasting vessels. If there is an increase in motor transport, particularly private cars, with the lifting of the tax burden, there may be a considerable decrease in the over-all passenger load in contrast to what it was before the war.

**Canals.** There is a vast network of small canals throughout most of the level districts in Japan; many of them are centuries old, but the majority date back to the Tokugawa era when internal commerce expanded rapidly after the suppression of the feudal wars. Most of these canals are very narrow—6, 8, and 10 feet wide—and were designed to accommodate small man-drawn or horse-drawn boats. They are still in general use, but their freight tonnage is necessarily small.

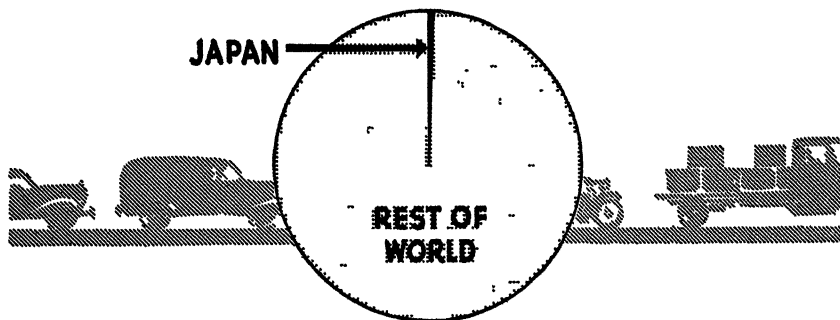
However, a great amount of local freight is carried on the extensions of the canal system within the large cities, where pole-

pushed sampans and barges serve much the same purpose as do delivery cars and trucks in the United States. Several large canals in the five principal cities, particularly Osaka and Nagoya, carry heavy industrial cargoes on barges of many tons burden. The most important is the great barge canal between Yokohama and Tokyo that was built during the period of reconstruction after the 1923 earthquake and fire. Completed in 1929, this canal transported 20 million tons of freight in a normal peacetime year. This may approach the annual freight tonnage carried by ships that pass through the Suez and Panama Canals each year.

An extensive program calling for a great expansion and improvement of the barge canal system in several industrial areas was projected before the war.

**Motor Transportation.** According to the last available information, there were 200,000 motor vehicles (more than half of which were

## MOTOR TRANSPORTATION



trucks and busses) and 75,000 motorcycles in all Japan proper. This was only four-tenths of one per cent of the total number of motor vehicles in the world. About one person in 400 owned any kind of a motor unit before the war. These figures do not of course include military vehicles.

There were several limiting factors in the use of motor cars. The most important was the very low average income which placed any kind of motor vehicle, even the extremely low-priced Datsun bantam cars, motorcycles, and motor tricycles of Japanese manufacture, out of the reach of all but about 10 per cent of the population. Actual purchases were further limited by the fact the government took the position that a motor car was a great luxury and taxed it accordingly. Motor fuel, like all imported commodities,

was very expensive and its price was increased by taxation. In part this high price was deliberately maintained to reduce civilian consumption of petroleum products so that most of the always considerable imports could be added to the military stock pile. Actual gasoline rationing was imposed soon after the beginning of the war with China. By 1940 civilian use of motor cars, especially private cars, was practically prohibited, and most common carriers had been converted to charcoal gas by various unsatisfactory and inconvenient methods.

The military began to requisition cars and trucks before the attack on the United States in December, 1941. Judging by the amount of such equipment since destroyed or captured, the requisitioning must have been extensive and the number of motor vehicles now in Japan proper must be very small.

There was a considerable development of short-haul bus transportation prior to the war. How much of the rolling stock remains after the extensive military confiscation and how much of it is usable or even repairable cannot be estimated. Whether any extensive bus service can compete with tram lines powered by hydroelectric plants is a subject for further study. Certainly electric busses of the trackless-trolley type that are common in some European cities should prove feasible in Japan.

Motor truck transportation of freight will be restricted because of the relatively high cost of petroleum products, the inadequacy of many streets and roads for heavy hauling, and the comparatively low cost of other means of local transport, particularly boat and barge canal.

**Air Transport.** The first flight of a plane piloted by Japanese aviators took place in 1910, and an army airdrome was built the following year. Commercial aviation was slow in developing because the climate and terrain on Honshu make flying very hazardous. The many mountains are hidden in mist and clouds most of the time. High winds and sudden storms are usual eight months of the year, and air pockets are common enough to make travel uncomfortable on any but the largest planes. However, there had been some development in civilian aviation by the time the first aviation control law was passed in 1921.

In 1925 the first air mail was established between Osaka and Tokyo; this was absorbed in 1929 by the Japan Air Transport Company, which converted the route into one leg of an all-empire pas-

senger and mail service. In 1938 the Japan Airways Company was established, with a capitalization of 100 million yen and a monopoly of all air lines. In 1938 a 17-hour service over the 2500-mile route to the mandated islands on the equator was instituted. In 1940 the Tokyo-Bangkok line was opened and through connections to Europe were available. The same line made a stop at Hongkong to connect with the American-China clipper service.

In 1939 two Japanese commercial planes made widely advertised flights. One went to Persia and returned, and the other made a 58-day "good-will" junket around the world under the aegis of the Tokyo *Nichi-Nichi*, a metropolitan daily.

However, commercial aviation in Japan has always been an adjunct of military aviation—either its stalking horse or its trial laboratory—more so than in any other country in the world, even Germany. A detailed discussion of commercial aviation is beyond the scope of this work. Suffice it to say that it has proved a dangerous weapon in Japan's hands.

Japan should be allowed to retain only enough cargo planes for legitimate *internal* traffic, which, in a country where distances are comparatively small, will mean few planes. One mail and passenger line from Kagoshima to Hakodate, via Nagasaki, Moji, Kobe, Nagoya, and Tokyo, and possibly three short auxiliary lines from the principal cities to the ports on the Sea of Japan—when and if the need for them is demonstrable—are all that is indicated. Even these should be under the immediate administration of the occupational forces and be staffed by them for a period of years.

All external air traffic to and from Japan should be in Allied planes, entirely and eternally under Allied operation. This will mean immediate American control of transpacific air lines to Japan, with Chinese and Siberian lines participating as they are developed.

## VII.

# Telecommunications

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**Telegraph.** According to Japanese accounts, a telegraph line was put into operation between Yokohama and Tokyo in 1869, and shortly afterward Tokyo became the center of a growing network of lines extending the length of the main island. In 1872 a cable was laid across the straits at Shimonoseki and the line was extended to Nagasaki in west central Kyushu.

In 1936 there were some 31,000 miles of telegraph lines in Japan proper, and about 1000 stations; in addition, there were over 6000 post offices from which telegrams could be dispatched. These facilities were used very extensively. Sixty million messages were sent that year, a little less than one for every man, woman, and child in Japan. This total was exceeded only by that in the United States (190 million messages in 1938), the ratio of messages to population was exceeded in the United States, Great Britain, Australia, Canada, Norway, and Sweden. The Japanese sent approximately three times as many telegrams per person as did the Germans and more than twice as many as the French.

Japan apparently lacks modern telegraphic equipment. The last available report said that there were only 70 teletype printers in the whole country, most of them in the offices of the big city newspapers. Telephoto service was inaugurated in 1930 with a device said to have been invented by the Nippon Electric Company, but there were only four sets in operation according to late reports.

Her telegraph system, as is true of every other means of telecommunication, is operated by the imperial government. Communication Bureau reports state that while the need for automatic devices is great, there is continual objection to their use because they are expensive and would cause "many government employees to lose their jobs."

**Cables.** For many years all overseas cable service to Japan was owned and operated by the Great Northern Telegraph Company, a Danish corporation controlled by British capital. In 1869 this com-



pany constructed a network of underseas cables in the Baltic, connecting Copenhagen with Helsingfors (Helsinki) and St. Petersburg (Leningrad). By 1871 it established overland wires to Vladivostok, whence cables were laid to Shanghai, Nagasaki, and Hongkong.

In 1882 the company received a charter from the imperial government giving it a complete monopoly of underseas cable service to Japan. This expired in 1912. However, since the company controlled all cable and wire service in China, the Japanese government could not establish cable service to Shanghai, the great communications center of the Far East, without paying royalties to the Great Northern.

In order to have some overseas communications outlet that was not controlled by the Great Northern, the Japanese made strenuous and continuous efforts to develop radio communications, and laid a cable to the Bonin Islands (about 800 miles south of Tokyo), the terminal of an American cable to San Francisco, via Midway and Honolulu.

Although Japan's chief complaint against the Great Northern had been "excessive tariff rates," the rates on the government-controlled cable to the Bonins were excessive in the extreme. The rate per word over that short line was greater than that charged by the American Cable Company for transmission from the Bonins to San Francisco—more than three times the distance. For that reason it was cheaper to route messages from San Francisco to Shanghai and back to Japan over the Great Northern's cable than to send them direct. This was the usual procedure, except with messages sent by Japanese nationals in the United States, all of whom were under orders from their government to demand that their messages be sent via the Bonins.

In the July, 1940, issue of the *Tokyo Gazette*, the Bureau of Communications made the following announcement:

"1. The company's [Great Northern Telegraph Company's] right to operate cables at Nagasaki would be restored to the Japanese government on June 1, 1940.

"2. The landing of the company's cables in Nagasaki would be limited to April 30, 1943, when the submarine cable business of the company shall be terminated."

This was, of course, outright expropriation undertaken at a time when Great Britain's fortunes in World War II were at a low ebb

and Denmark was a helpless vassal of Germany. When this order was carried out, the Great Northern's cables were handling about 1300 messages daily at Nagasaki—approximately 20 per cent of Japan's total overseas telegrams—in spite of the war in China and Europe.

The position of the Great Northern Telegraph Company in the Far East is too complicated to discuss here, but it will certainly call for action to be taken by the occupation commission regarding its properties in Japan.

Cables operating out of Japan, as reported by the Ministry of Communications in 1936 were as follows:

Tokyo-Bonin . . . . .	673 nautical miles
Sasebo-Guam . . . . .	1574 nautical miles
Nagasaki-Shanghai . . . . .	470 nautical miles
Nagasaki-Tansui . . . . .	700 nautical miles
Nagasaki-Dairen . . . . .	650 nautical miles

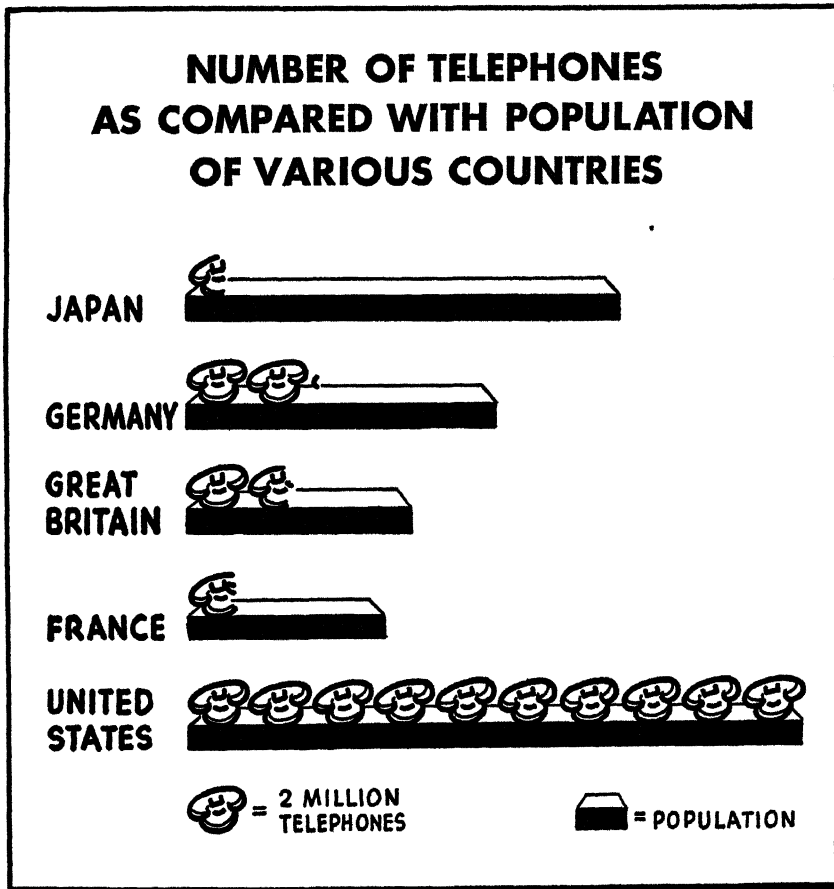
**Telephone.** The first Japanese telephone exchanges were established in Yokohama and Tokyo in 1890. Telephone service was greatly extended during the next forty years and its growth accelerated increasingly after 1930 until the wartime curtailment of all civilian services began in 1938.

On January 1, 1940, there were 1,367,000 telephones in operation, as opposed to 4,226,000 in Germany, 3,375,902 in Great Britain, 1,589,000 in France (the latter two countries have only a little over half of Japan's population), and more than 20 million in the United States. Yet there were nearly 5½ *billion* calls over Japanese phones in 1939, more than twice the number in Britain and nearly twice as many as in Germany.

The reason for this is that the Japanese government has never been able or willing to meet the public's demand for telephone sets. In Japan the possession of a telephone not only is a convenience, it is a social achievement. A private home or even a business firm may be on the waiting list for several months or perhaps years before a telephone is installed. People of means who wish immediate installation "buy" a telephone number, either from some individual who is willing to relinquish his right or from some bureaucrat who has one at his disposal, and pay for the telephone set and for "special" installation. This frequently costs several thousand yen. Prominent

men proudly list their home telephone number in the Japanese *Who's Who*.

The opinion in Japan is that the government has deliberately impeded the manufacture and installation of telephone sets, in the belief that it could derive greater revenue from toll charges on pub-



lic phones. But the *Japan-Manchukuo Yearbook* for 1935-36 says, "The increase of subscribers and *toll lines* is too much restricted to meet the social demand."

The cost to the subscribers was heavy. In Tokyo in 1936 the cost of an "ordinary" installation (as opposed to the "special" installation mentioned above) was 500 yen, plus 45 yen a year, plus 3 sen for every call in the subscriber's immediate area, the charge in-

creasing progressively for outlying areas. In other cities all the charges are lower and decrease with the number of local subscribers.

Automatic telephone exchanges were established in Tokyo in 1925. Although the number of subscribers so served increased during the next fifteen years, they are still far exceeded, even in the largest cities, by the number served by manual exchanges.

The government telephone monopoly has consistently refused to spend enough money to enlarge its local service to meet the public demand but has spent a great deal of money in establishing an amazing network of subterranean and submarine telephone cables that connect all the Japanese islands and extend into Sakhalin in the north and through Korea into Manchuria. Practically all this development took place within the past fifteen years, most of it within the past ten.

It is true that the commercial demand for long-distance telephone service between Japanese cities and between Japan and her dependencies was heavy after the conquest of Manchuria and the consequent stimulus to trade. Furthermore, it is difficult to maintain overhead wires in a country where there are likely to be from two to six typhoons a year. But this still does not account for the inordinate percentage of the telephone company's revenues that was spent on long-distance lines from which the returns were small in comparison with those from local and interurban lines. Relatively inefficient apparatus was maintained for local service long after it was outmoded, on the ground that it was good enough. But various expensive cables in long-distance service were tried for a short time and then dug up, to be replaced by new types only slightly more efficient. The reason for this was the army's insistence that the minister of communications maintain the most modern and efficient long-distance service that money could buy—and it was money paid by the local telephone subscribers that bought it.

Thus the telephone company not only had to show a profit to the government and pay interest to the bondholders whose money financed the original installations, but was forced to establish and maintain a superior but immediately uneconomical long-distance service at the behest of the army. Hence it was absolutely impossible for it to enlarge its local facilities to meet the public's requirements.

Nearly all the telephone equipment used in Japan is made locally,

from the frail-looking handsets so eagerly sought by the public, to complicated switchboard and repeater stations. It is fairly efficient and quite cheap. Once the telephone monopoly fills a real public service instead of being the servant of the army and a milch cow for the imperial treasury, it will have no difficulty in doubling or tripling the number of outlets now available. The demand already exists. The ordinary citizen will gladly pay a comparatively large fraction of his income to maintain a telephone in his house and in his shop or office.

The Japanese are chronic telephone "visitors." The pride and joy the average family takes in being able to call up its friends and relatives over its own phone cannot be overestimated. Any authority that can give them that privilege at a reasonable charge will win the profound gratitude and admiration of a large section of the public.

**Radiotelegraphy.** The first use of wireless in Japan was a shore-to-ship contact made in 1908. From that time on, the development of radiotelegraphy followed the usual Japanese pattern. Foreign equipment was imported and copied. Foreign technical instruction was sought and implicitly followed until Japanese engineers and technicians were sure enough of themselves to take over on their own. Considerable experimentation was carried on, most of it by professional radio engineers employed by the government or by government-controlled agencies but some by amateur operators, of whom considerable numbers were licensed during the period between the two World Wars. But the Japanese contributed little or nothing original to radio science, as far as is known. As in all fields of science other than bacteriology, they have proved to be good at adaptation but poor at invention. They are, on the whole, adequate and very painstaking radio operators.

Overseas radiotelegraphic service began in 1916, with regular communication between large spark stations at Funabashi and Hawaii. Because cable communications with the outside world were owned and operated by the foreign-controlled Great Northern Company, the Japanese government made every effort to develop radiotelegraphy. In 1925 the Japan Wireless Telegraphic Company, Ltd., was organized for the purpose of financing the construction of long-range radiotelegraphy stations. The company was capitalized for 20 million yen. Japan's men of money were invited to invest and to participate in the profits of the company, but not in its control, for the

management of the stations themselves remained directly in the hands of the Bureau of Communications.

Seventeen short-wave vacuum-tube transmitters were ultimately installed at Oyama, near Tokyo, the receiving station was at Fukuoka, and both were under the Tokyo Central Telegraphic office. The equipment was originally designed to handle all commercial traffic to North and South America, but later it opened several channels to Europe.

The Yosauri transmitting station, near Nagoya (5 short-wave vacuum-tube sets and a long-wave generator), and one receiving station near Kobe, both operated by the Osaka Central Telegraph station, were intended to handle traffic for Europe but were soon limited to China, India, Indo-China, Paris, and Berlin.

In 1938 considerable mention was made of a project to install 21 additional circuits, but if they were established they were in the hands of the military, for nothing more was heard of them. Though Japanese periodicals boasted a great deal about Japan's commercial radiotelegraphy, it proved to be a rather weak rival of the Great Northern's cable service.

Radiotelegraphic communications between Japan and her dependencies (Manchuria, Korea, and the insular possessions) were handled by a dozen short- and medium-wave transmitters of rather low power (2 to 20 kw.) located at Kemikawa, on the Chiba peninsula across the bay from Tokyo. The receiving station for this service was at Iwatsuki, Saitama prefecture.

At last report there were 7 aeronautical radio stations in Japan proper, located at strategic intervals near the larger commercial airports. The reported locations were Tokyo, Hakone, Kameyama, Osaka, Tukuokea, Izuhara, and Tonie. No details on their equipment are available.

In addition to the foregoing, Japan maintained more than a score of shore stations for maritime communications along her coasts, a small network for inland and inter-island communications (radio-télégraph), and a dozen or more radio beam, radio compass, time signal, and weather report stations, all of them adequate.

**Radiotelephony.** Commercial radiotelephony is said to have started with ship-to-shore conversation at Kobe in 1914, but it was fifteen years before this service was regularly available. As late as 1936 the Bureau of Communications reported only 7 Japanese ships equipped for public telephonic communication.

In 1932 the Internation Wireless Telephone Company was established, after the same pattern as the Japan Wireless Telegraphic Company. By 1934 a large transmitting station was erected at Nazaki (Ibaraki prefecture) some forty miles north of Tokyo, with a fully equipped receiving station at Komura (Saitsama prefecture) twenty miles away.

Transmitting equipment was said to have been excellent—two 20-kw. sets for traffic to England and America, and three 20-kw. sets for Formosa, Manchuria, and the South Seas—with all modern improvements including “privacy,” crystal control, several directional antennas, etc. Ten additional transmitters were reported to have been in service in 1939.

Receivers and transmitters were directly connected with the Tokyo Central telephone exchange. Hence radiotelephonic communications were available to all of Japan’s telephone subscribers by 1934.

In 1938, when the National Mobilization Act was passed, the Japan Wireless Telegraphic and the Internation Wireless Telephone Companies were merged into a new government-dominated corporation, the International Telecommunications, Ltd. Considerable new equipment was installed at this time, essentially for military use. No details on this are available.

**Radio Broadcasting.** Not only has radio broadcasting in Japan been under direct and minute government control since its beginning, but the receiving of radio broadcasts, even in peacetime, was more completely regulated than in any other country in the world, with the possible exception of Germany after Hitler came to power.

Every radio receiver in Japan was licensed, the owner paying a few cents a month for the privilege of listening to the government broadcasting stations. The size, power, and scope of all receivers had to comply with regulations. No private person was permitted to possess a radio that was ordinarily capable of receiving broadcasts originating outside of Japan. Even foreigners ripped the short-wave coils out of their receivers to avoid trouble with the police.

There were about 2½ million licensed radio receivers in Japan proper, according to the last available reports. It was estimated that about one family in nine owned a radio before the war. Radio listening is a popular pastime, as shown by the crowds gathered around radio stores and other establishments where sets are kept in continuous operation. The initial cost of radios in Japan is very low, but

eight out of nine families could not afford the continual small drain on their incomes.

As the chief purpose of Japanese broadcasting has always been to disseminate propaganda and indoctrinate the listener with nationalistic culture and ideals, it would seem that the government defeated its own ends by so limiting the number of sets in use. But the Bureau of Communications policy held that radio broadcasting should pay its own way as far as possible, and the police maintained that if too many sets were in use, it would be impossible to check all of them for possible illegal equipment.

Technically Japanese broadcasting equipment is excellent. Twenty-seven stations were operating in the 550 to 1500 kc. band just before the war; they were located at strategic intervals throughout the islands. The largest were two 150,000-watt transmitters at Kawaguchi and Hatogoya in the Tokyo district, both using the call letters JOAK, and two 100,000-watt stations near Osaka. A few of the small ones used only 50-watt power, but the coverage of the whole net was very complete. No listener in Japan proper, even with only a crystal set, was out of the receiving range of one or more of these stations.

The Bureau of Communications early realized the importance of short-wave broadcasting and in 1935 established daily one-hour programs, using 20,000-watt transmitters. In 1937 the power was stepped up to 50,000 watts and the time to six hours on the 19-, 25-, 31-, and 48-meter bands. After Japan overran Malaysia and the East Indies, these coverages were greatly increased and continuous programs were beamed in every direction. The technical quality of these broadcasts as a rule was excellent, showing that the Japanese have made a considerable advance in radio engineering and in operating procedure.

Japan's production of radio equipment will be discussed under manufacture.



## VIII.

### Cities

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*According to the 1935 census, 32.7 per cent of Japan's inhabitants lived in the 127 large centers of population officially designated as cities. The percentage of urban dwellers has been steadily increasing with the growth of modern industry and this increase has been greatly accelerated by the boom in war production. Japan now has some 35 cities with more than 125,000 people, and 5, possibly 6, with more than a million. About 10 million people are concentrated in the strip of territory some twenty-five miles long on the west side of Tokyo Bay that includes the cities of Tokyo (7,100,000), Yokohama (900,000), and Kawasaki (225,000), and several contiguous towns. There are at least 7 million within a small triangle of land at the head of Osaka Bay, including Osaka (3,500,000), Kyoto (1,200,000), Kobe (1,100,000), Amagasaki (175,000), and several large towns.*

While the concentration of population in urban areas has increased both actually and proportionally during the past seventy-five years, Japan's cities have always been large. Kyoto had a population of half a million in the Middle Ages and for centuries it exceeded any city in Europe in size, with the possible exception of Constantinople.

The Japanese are group-minded people. They are happiest in crowds, if not in swarms. Except for newly settled areas, such as the island of Hokkaido, even the farmers live in houses tightly packed together on village streets. When Japanese workers seek diversion they seek it en masse. They crowd into theaters and motion picture shows, or they go in great swarms to visit temples or shrines or to view scenic spots or flowering trees. If an individual happens to find himself in a place of entertainment that is not crowded, he hurries away to one that is.

Japanese cities grow horizontally rather than vertically. There are no solid brick-and-mortar or steel-and-concrete residential areas such as are common in Europe and America. There are a few modern apartment buildings in Tokyo, most of them no more than

four stories high, but they are rare elsewhere. Tokyo has a number of modern multi-storied office buildings, but none of them can be called skyscrapers. Osaka, which is as large as Chicago, probably has fewer than a hundred such structures, and other cities, with the possible exception of Yokohama, have even less. Kobe and Yokohama have some modern concrete warehouses, but the great majority of Japanese businesses and factories are housed in one-, two-, or three-story buildings of brick, brick veneer, stucco, or wood, with wooden floors and wooden framework. Ninety-nine per cent of all the Japanese people, even in the largest cities, live in one- or two-story wooden houses with paper ceilings and paper partitions; frequently one or more of the exterior walls is made of paper or thin veneer.

Yet the population per acre in Osaka, for example, was as great as that in the downtown district of a multi-storied American city, because Osaka's one- and two-story houses were built wall-to-wall on unbelievably narrow streets and canals, with no open spaces such as parks, courts, parking lots, and the like. There are more inhabitants per square yard of floor space in middle-class homes in Osaka than in the worst slum in America.

The reason the Japanese continued to build such flimsy firetraps despite frequent disasters was as much a matter of economy as of national habit. They were the only kind of houses the ordinary citizens could afford to own or rent. Prior to the cessation of all private building in 1938, a city dweller could become the owner of a new home for the equivalent of \$600; time payments were scaled down to \$4.50 a month. Rents, especially in older buildings, were proportionally cheaper.

It should be noted that all the larger Japanese cities are conglomerations of towns that have been overwhelmed and annexed by their metropolitan centers. These former towns retain their identity as districts within the city by means of the common suffix *machi* (town) attached to their names. However, the *machi* are only one kind of subdivision within a Japanese city; all of them are worthy of mention because they commonly appear in every address.

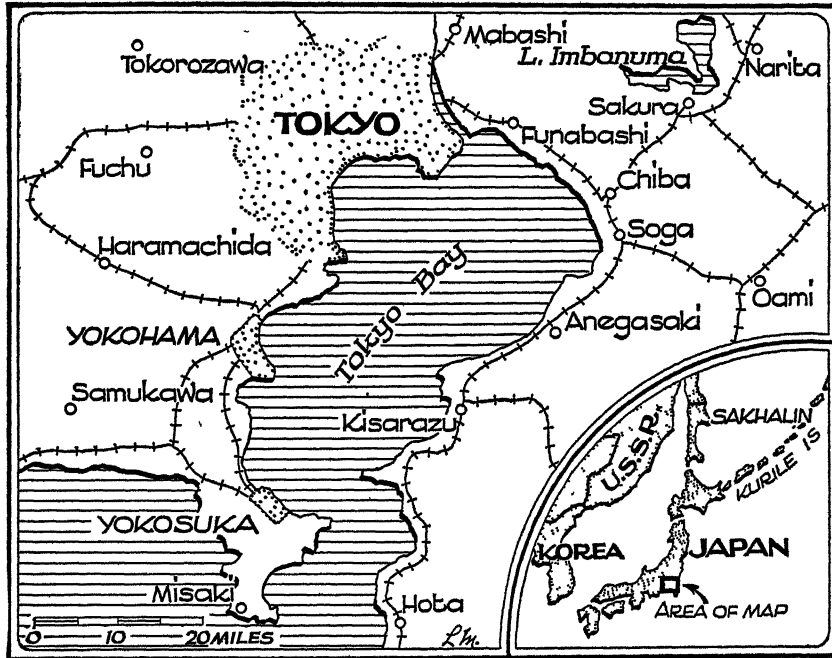
With certain exceptions in cities that have long been subjected to foreign influence, our custom of designating the location of a business or residence by the name of the owner or occupant, street number, street name, city, and state or province is not followed in Japan. There the normal method is to give the name of the

addressee, then the province, then the city, then the *ku* (ward), then the *machi* (town) or the *cho* (subdistrict) or both, the number of the *chome* (block), and the number of the house in the block.

The word *dore* (street) appears in addresses more commonly in Kobe than elsewhere.

#### TOKYO BAY REGION

Tokyo. Area, 217 square miles; population, 7,100,000 (1940). Compare with New York City's 310 square miles and 7,450,000 popu-



TOKYO BAY REGION.

lation. New York lost population during the war because of the lack of war industries, whereas Tokyo made considerable gains; hence it may now be the world's second largest city.

Great areas of Tokyo were destroyed during the earthquake and fire in 1923. Many lives were lost, perhaps as many as 200,000, though official figures are much smaller. To prevent a repetition of a similar disaster, six new avenues 120 feet wide and 120 new streets 36 feet wide were cut through the city. The principal business district was largely rebuilt with modern fireproof and earthquakeproof buildings, and fireproof apartments and business blocks were con-

structed in strategic locations elsewhere. Three large new parks and fifty small ones were laid out at varying intervals—all designed as firebreaks and places of refuge for the population in case of another conflagration.

Wherever the city planning commission left vacant spaces, flimsy, native-style houses soon sprang up. The last available data report that there were 1,100,000 buildings in Tokyo, of which 15,000 were classified as "of materials other than wood." Of these about 3400 were said to be "class A-1 fireproof." Thus at least 98 per cent of the buildings in Tokyo are still Japanese-style structures of wood and paper. Yet Tokyo is by long odds the most modern and most fire-resistant city in Japan.

According to the reconstruction plan, the commercial, industrial, and residential districts were to be separated as another safety measure, instead of being jumbled together as they still are in the older Japanese communities. This plan was carried out to a degree, but workers' shacks began to crowd into the factory districts and building restrictions were so relaxed during Japan's depression (1927-31) and after the use of steel was prohibited in all private construction in 1938, that wooden buildings appeared even on the fringes of the great Marunouchi business and administrative district in central Tokyo.

Tokyo owed its earlier growth to the fact that, situated at the elbow between the north-south and east-west extension of Japan's main island, it was the natural communications center of the nation. The Tokugawa shoguns established their administrative headquarters there, and after the "restoration" in 1868 the Emperor and his court were moved to Tokyo (then Yeddo) from Kyoto.

Lying near the head of the bay, the harbor was, and is, too shallow for large ships, but the city was the center of an extensive system of roadways and canals, and it soon became the heart of Japan's railway communications. It is reported that 41 tracks, all electrified, led into the big station in the Marunouchi district in 1941.

In banking and commerce, particularly in retail trade, Tokyo leads the nation, but it did not become important in heavy industries until after 1931. Most of the industrial plants are new and are therefore, on the average, better housed than other Japanese factories, except those in the Yokohama-Kawasaki area. The 1935 *Japan Commerce Yearbook* states, "Tokyo has been a great consuming rather than a great producing center, but now it bids fair to pass

Osaka in many industries." A new and heavily subsidized machine tool industry—so vital in modern war—was growing in Tokyo, apparently because the plants in and around Osaka could not expand fast enough to meet the demands of the army and navy.

In 1936 the total value of industrial output in Tokyo was 2000 million yen (the value of the yen at that time was 27 cents). Broken down into the major categories it was:

1. Machine and machine tools...	461 million
2. Chemicals .. .. .	394 million
3. Metal products . . . . .	319 million
4. Provisions . . . . .	244 million
5. Spinning . . . . .	207 million
6. Printing and binding . . .	116 million
7. Gas and electricity . . . .	114 million
8. Woodenware . . . . .	34 million
9. Ceramics .. . . .	21 million
10. Miscellaneous . . . . .	37 million

It is doubtful if Tokyo's more modern factories surpassed the older industries of Osaka in war production. Indeed, there is considerable indirect evidence that Osaka's production accelerated much more rapidly after 1938 when all new plant construction was stopped.

However, Tokyo's industries were and will be important in the export field because as a rule the output of its factories that was intended for foreign trade was finished with greater care and with greater regard for and knowledge of the tastes and prejudices of overseas customers. This is easily understood when it is remembered that the Tokyo Bay area had a far greater foreign population than any other district in Japan and attained a degree of "westernization" not found elsewhere.

*Kawasaki. Estimated population, 225,000 (1941).*

Kawasaki was not listed as a city until 1924. The new city hall is eight miles from the Yokohama railway station and ten miles from the great central station in Tokyo. Kawasaki is the heart of the new industrial strip that has grown up roughly parallel to the railway, canal, and bay shore between the larger cities.

The great boom here came after the conquest of Manchuria in 1931. In 1937 there were 205 factories employing more than five workmen each, with an output valued at 350 million yen. All of these plants are termed "modern" and some are called "the most modern

in Japan" in Japanese periodicals. Nearly all were producing for war, directly or indirectly. Among them were the two most modern oil refineries in Japan, the largest producer of radio parts, several chemical works, and metal processing plants by the dozen.

Kawasaki has its own harbor on the bay; it is immediately adjacent to the Tsurumi section of Yokohama's outer harbor. Extensive improvements were being made there right up to the time of Japan's attack on Hawaii. How much of this city and its industries has been spared by American bombs is not known, but bomb damage is said to have been heavy.

Kawasaki may be of considerable industrial importance after the war.

*Yokohama. Population, 866,200 (1940); area, 72 square miles. Compare Baltimore, 859,000. Because of the nature of its industries, its population may have exceeded one million in 1942.*

Located eighteen miles south of Tokyo, Yokohama is Tokyo's port for deep-sea shipping. Several rail lines (electric) and a busy barge canal connect the two cities.

The earthquake of 1923 and the fire and tidal wave which followed it destroyed Yokohama almost completely. The entire harbor had to be dredged because the quake caused the bottom to bulge up from two to six feet in places. All the commercial buildings, the warehouses, and most of the structures in the important industrial district adjacent to the inner harbor and the Tsurumi Harbor are now concrete and very strongly constructed. Bombing damage is not known.

The former foreign residential quarters on the hill above and to the south of the business district are likewise quite modern. But the so-called "native town" was largely rebuilt with the same type of Japanese structures that burned so frightfully after the earthquake.

Among Yokohama's industries are two large shipyards, one in the inner harbor and one in the Tsurumi district, an automobile factory—the former Ford works, converted to the production of tanks and tractors during the war—five oil refineries, including two in Tsurumi whose output was the largest in Japan, and an extensive chemical and machine tool industry with many plants.

Yokohama Harbor normally handled 25 per cent annually of all Japan's overseas trade.

*Yokosuka. Population, 203,000 (1937).*

Yokosuka is a great naval base about seventeen miles south of

- Yokohama near the entrance to Tokyo Bay. When Japan is disarmed this city will revert to its former status as a fishing village and tourist rendezvous. The city has existed for the navy and its personnel. It is interesting to note that the Japanese navy supported three large towns—Yokosuka, Kure, and Sasebo—that had practically no other reason for existence, as well as maintaining large establishments in all of the port cities.

## NAGOYA

*Population, 1,249,000 (1940). Area, 69 square miles. Compare Los Angeles, 1,504,000; area, 464 square miles Half a million people live within ten square miles in the congested inner city.*

Nagoya is a port city at the head of Atsuta Bay, about 160 air miles west-southwest of Tokyo. Although the textile industry has spread into nearly every prefecture in Japan during the past twenty-five years, its greatest concentration is in Nagoya and the smaller cities and towns in the immediate vicinity. Nagoya ranked first in the production of cotton piece goods, according to the last figures released before the war, and was an important producer of rayon yarn, but it was most important in the fabrication of woollens and mixed woollens of all types. The growth of the woolen industry was due "to the favorable effects of the consistent humidity," according to a statement of the Nagoya Chamber of Commerce.

The city's history is brief. It was founded about 330 years ago by a younger son of the first of the Tokugawa shoguns, who was given the district as a fief. This cadet branch of the Tokugawas produced good administrators and men who loved art. Nagoya became a city of silk weavers, dyers, and potters. The population remained stationary at about 100,000 until the end of the nineteenth century, when one Katoaka began to weave a kind of serge that immediately became popular among the Japanese for winter kimonos instead of the padded silk and cotton formerly used.

Large woolen mills had already been established in Tokyo and Kobe but they were kept in operation by government contracts for cloth for uniforms. The mills that soon sprang up in Nagoya were all comparatively small and were engaged in making cloth of many different textures and designs for domestic and foreign trade; the few large mills in Tokyo and Kobe continued to produce great quantities of a few standardized patterns, including much cloth

for uniforms. In 1936 about 55 per cent of all woollens made in Japan was produced in Nagoya, most of them from Australian wool.

Nagoya's greatest growth came after the First World War. Many of its factories are new and are housed in modern buildings, although after the ban on the use of steel in 1938 only temporary wooden structures could be used. The town itself, except for the central business district, has buildings made of the usual flimsy native materials and is badly congested. An estimate made in 1937 puts the number of buildings at 300,000, about 6000 of which were made "of materials other than wood"; of these, 610 were classified as "A-1 ferro-concrete."

It is significant that there are no reports of Nagoya's 1937 industrial production; neither is there the usual breakdown of the 1936 figures, whose total is placed at "about 1500 million yen" by one Japanese writer. This is probably due to the fact that Nagoya's industries, like those of Osaka, were converted to war production earlier than those of Tokyo and other cities.

The importance of airplane production is shown in the following breakdown of figures for 1935. The large Mitsubishi bomber plant, a target of the Doolittle raid in April, 1942, is in Nagoya.

Cotton fabrics. . . . .	221 million yen
Woolen fabrics . . . . .	182 million yen
Cotton yarns . . . . .	115 million yen
Pottery . . . . .	53 million yen
Airplanes . . . . .	40 million yen
Woolen yarns. . . . .	32 million yen
Confections. . . . .	24 million yen
Textile machinery . . . . .	20 million yen
Wheat flour . . . . .	19 million yen
Sake, whisky, beer . . . . .	19 million yen
Vehicles. autos, trucks, bicycles, motor tricycles . . . . .	13 million yen
Rayon yarn. . . . .	13 million yen
Miscellaneous: clocks, chemicals, toys, wood products, electrical apparatus . . . . .	37 million yen

It is to be noted that, with the exception of airplanes, all of these industries, as of 1935, will fit into Japan's post-war economy. Few of them were artificially stimulated by subsidies. The types of textiles produced were either those that will find a ready market abroad—Nagoya's trade was largely with Asia and the South Pa-



cific—or those particularly designed for home consumption. The pottery is excellent and was popular everywhere. The automobiles, trucks, and motor tricycles were small, economical vehicles that provided transportation for poor men and were suitable for the narrow, winding roads. American industry is not geared to produce these types because there is no home market for them, but they found a ready sale in Japan and throughout Asia. The bicycles were fairly good and very cheap.

Furthermore, Gifu and Toyama prefectures, north of Nagoya, are the best sources of hydroelectric power in Japan. It has already been brought in to Nagoya, which is closer to this source than either Tokyo or Osaka. This is of great importance in a land so lacking in coal reserves.

Although foreigners knew less about Nagoya than any of the other six large Japanese cities before the war, it will probably be much better known in the post-war world.

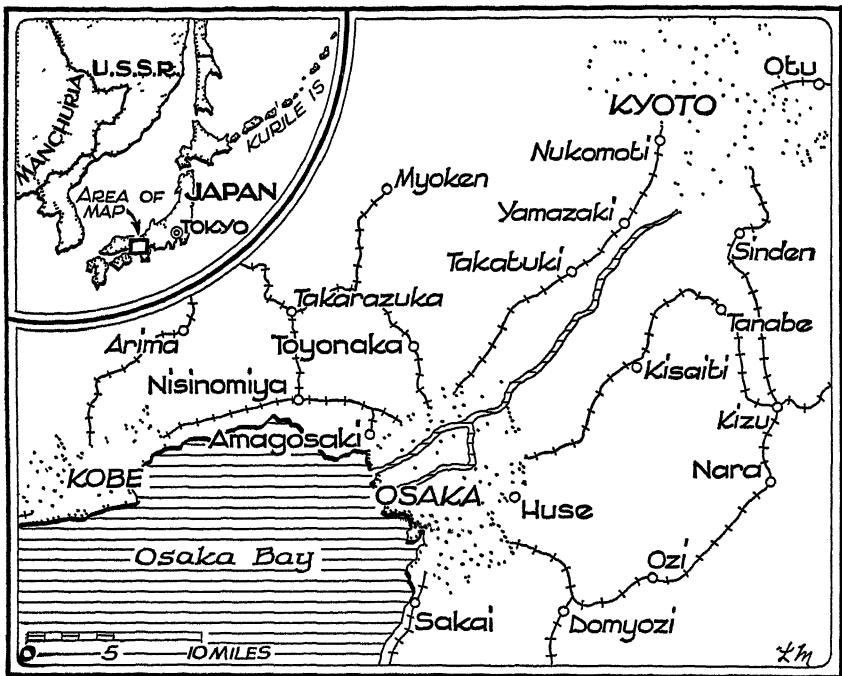
#### THE OSAKA BAY CITIES

The Osaka Bay cities include Osaka, at the head of the bay of the same name, Kyoto, twenty-six miles inland—the only large inland city in Japan—and Kobe, on the bay twenty miles west of Osaka. Though each city is in many respects different from the others, they form, together with numerous contiguous cities and towns, the most important industrial and commercial unit in Japan. This is made clear by the fact that Yokohama, the deep-sea port for the entire Tokyo Bay area, handled about 25 per cent of all of Japan's overseas trade during the late pre-war years, whereas the harbors of Kobe and Osaka handled 59 per cent during the same period.

Parenthetically it must be noted that all six of Japan's great cities are located on the southeastern half of the western extension of Honshu, and that the most easterly, Tokyo, is only about 275 air miles from the most westerly, Kobe.

In view of the fact that a considerable part of this short stretch of Honshu's Pacific coast is too mountainous to be habitable, it contains the most remarkable concentrations of humanity in the world. This is not accidental. The south shore of Honshu has not only Japan's best and most strategically located harbors—directly on the north Pacific trade route—but also some of the best and most pro-

ductive of the scant valley land in the islands. Furthermore, the climate is more favorable than it is anywhere else in Japan or eastern Asia; the rainfall during the growing seasons is more dependable, and the winters are comparatively dry and open, with never enough snow or cold weather to interfere with industry or commerce. This is in contrast to the fogs and occasional droughts on



OSAKA BAY REGION.

Hokkaido and northern Honshu and the deep snows in the mountain valleys and on the coast of the Sea of Japan, where summers and winters are more like those in Georgia and Maine respectively.

*Osaka. Population, 3,394,000 (1940). Compare Chicago, 3,396,000. Total area, 70 square miles. Osaka had a great war-time expansion in population; in 1942 it was probably in excess of 3,500,000. Three-quarters of the people live in the old city, an area twenty miles square.*

Osaka has been described as "a poor man's Venice with Pittsburgh's atmosphere and more, narrower, dirtier canals." The city is situated on a mud flat at the mouth of the Yodo River and is

transversed by some twenty large canals—originally the embouchures of the river—and literally hundreds of small ones. There are two, possibly three streets than can be called “broad,” but the average thoroughfare is no more than fifteen feet wide and the by-streets are rat runs three, five, or seven feet wide. Most of the canals are eight or ten feet wide; they correspond to the alleys in an American city. A great deal of traffic is carried on them in sampans and other pole-pushed craft.

In 1935 Osaka was said to have half a million buildings, of which only 5000 were “of materials other than wood.” About 100 of these were “of stone or marble” and no more than 100 were “class A-1 ferro-concrete.”

Great sections of the city have been wiped out by fires from time to time, but there has never been city-wide destruction as there was in Yokohama, and hence there has been no planned modernization. The sections destroyed have been rebuilt as speedily as possible with the same flimsy native structures, and each time the buildings have been crowded a little closer together. The few modern buildings are banks, offices, department stores, etc.

Though there is some concentration of new industries in the outskirts of Osaka, particularly along the river and at the new Inner Harbor, there is no differentiated industrial district. The whole city, with its “3000 factories employing more than five hands,” its “7000 tall chimneys belching smoke,” and its countless thousands of small one-family factories, is one huge industrial slum.

The larger plants are housed in a conglomeration of buildings that range in material all the way from the wattle and mud of the first units built to the concrete used in the latest ones. Wooden and brick-veneer buildings are common. The reason the factory buildings are so much worse than those in the Tokyo-Kawasaki-Yokohama area is that they are so much older. Osaka had extensive handicraft industries in Tokugawa times and was the first city to become industrialized in the modern sense.

An admittedly incomplete report on Osaka’s industrial output for 1936 (no later figures appear in any known reports) give the total as 1,563,000,000 yen—“not including certain items.” The report<sup>1</sup> says significantly: “The principal products were metallic, 28.7%; machines and tools, 21.0%; and chemicals, 16.7%, showing that the munitions industry has been most prosperous among all.”

<sup>1</sup> *Japan Times Yearbook* for 1938.

The port of Osaka could not accommodate large seagoing vessels until 1903, when it was extensively dredged and enlarged. Up to then Kobe was the deep-sea port for Osaka and much of the latter's industrial production is still shipped through Kobe; however, the port of Osaka handled 24 per cent of Japan's total overseas trade prior to the war.

At this writing the city of Osaka still stands. However, it is the most important and most vulnerable of Japan's centers of war production.

*Amagasaki. Population, 175,000 (1940)—71,000 (1935).*

Amagasaki, a new but very important industrial city, lies across the four rail and trolley lines between Osaka and Kobe. It has a large oil refinery, several steel mills, and various plants for making machinery. The plants are new and most of them are modern. Many are branch units of large firms in Kobe and Osaka.

*Kobe. Population, 1,006,000 (1940); area, 36 square miles. Compare Cleveland, 887,000.*

Kobe is Japan's foremost shipping port, it handled 36 per cent of all the country's overseas trade before the war. It also ranks first in shipbuilding. The huge Mitsubishi and Kawasaki shipyards (on either side of Hyogo Harbor, the city's adjacent port area) are the largest in Japan and have been devoted principally to naval construction. Both of these yards have large marine engine and motor plants (now under government control), as well as plants that build airplane engines. The Kawasaki yard has an airplane plant on the west side of Kobe. There are several steel mills, as well as a government-owned plant for the manufacture of locomotives and railway cars.

The docking and warehouse facilities at the main harbor are the largest in Japan and as modern as those in Yokohama, whereas many of the warehouses in Osaka are built of wood and sheet iron.

Many modern homes occupy the hills behind Kobe, but the old town on the flats around the harbor contains some of the worst industrial slums in the world; they rival even those in Osaka.

Kobe has been bombed, but the extent of damage is unknown.

*Kyoto. Population, 1,177,000 (1940); area, 72 square miles. There has been a large population increase during the war.*

Kyoto was the seat of the Mikado's court for centuries and it was, and is, an important religious and cultural center. It has long been important in skilled handicraft—the production of silk and brocade,

lacquer ware, and artistic metalwork. In 1930 its total industrial production was valued at only 172 million yen, but this rose to 300 million in 1935. According to Japanese commercial reports, this was "due to the advance in foreign trade and the increased activities of the munitions industries"—the lacquer makers learned to make explosives and the art-metalworkers learned to make arms. After 1935 production increased greatly, but no exact figures have ever been published.

There were 9000 households operating small power or hand looms in one ward alone in 1935, producing high-grade silk, woolen, and linen fabrics. With the exception of a few large cotton spinning and raw-silk reeling mills in the outskirts, all of Kyoto's industries were small or medium-sized (three to fifteen employees) and were scattered all through the city. In spite of temples, castles, and parks, Kyoto is another industrial slum; the section around the main depot rivals any section in Osaka or Kobe in squalor and congestion.

Embroidery, pottery, and silk dying are important industries in peacetime. Many of the city's inhabitants made their living catering to the needs of tourists and pilgrims.

Kyoto, a military arsenal, is vulnerable to air attack, but has not been reported bombed at this writing.

#### OTHER CITIES

**Hiroshima and Kure.** *Population, 340,000 and 262,000 respectively.*

Hiroshima is an Inland Sea port on the single, vitally important, and wholly inadequate rail line between Kobe and Shimonoseki. Kure lies a few miles south of Hiroshima, at the end of a branch line.

Hiroshima was the home base for the "ever victorious" fifth army that conquered Singapore. Its arsenal, in the old castle near the railway station, was so important that no foreigner was admitted for twenty years prior to the war.

Hiroshima's port handled 500 million yen in foreign trade in 1935. Its industrial production that year amounted to 400 million yen; the important products were canned goods, fabrics (cotton, rayon, and silk), rubber goods, needles and small tools, pottery, and fishing products. An important military objective, this town will continue to be an important port after the war.

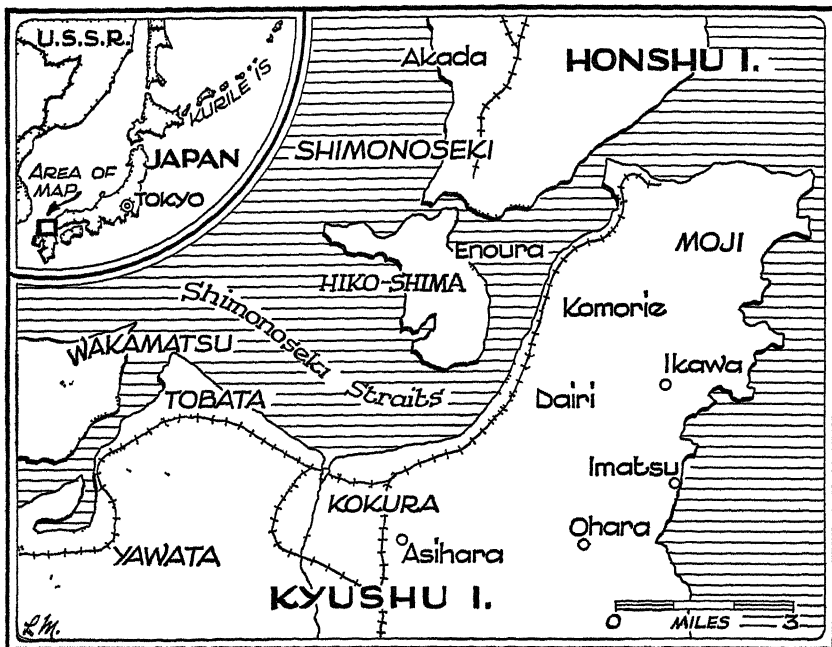
Kure, a port on the same bay, is a great naval arsenal that exists

primarily for the navy. The Imperial Naval College is only three miles away.

#### SHIMONOSEKI STRAITS CITIES

**Shimonoseki.** *Population, 149,000 (1937).*

Shimonoseki lies on the Honshu side of the straits of the same name, the western entrance to Japan's all-important Inland Sea.



SHIMONOSEKI STRAITS REGION.

Hundreds of thousands of tons of coal, iron ore, rice, grain, cotton, and other bulk products from Korea, Manchuria, Siberia, Mongolia, and north China are landed here, the majority to be reshipped by rail or small vessels to Kobe, Osaka, Nagoya, or Tokyo. Considerable local coal tonnage is handled here. In 1939 Shimonoseki was the only port in Japan that was equipped to handle iron ore with power shovels. Its heavy-industry production amounted to 216 million yen in 1935, and this increased enormously in the next seven years; ships, chemicals, steel plants, dynamite, motors, and minerals were among its chief products.

Owing to its strategic location in relation to Japan's trade with the



Newly hatched silkworms are brushed from the 'egg card' onto a tray of mulberry leaves. Cocoon producers buy these egg cards from specially licensed breeders (Wide World)

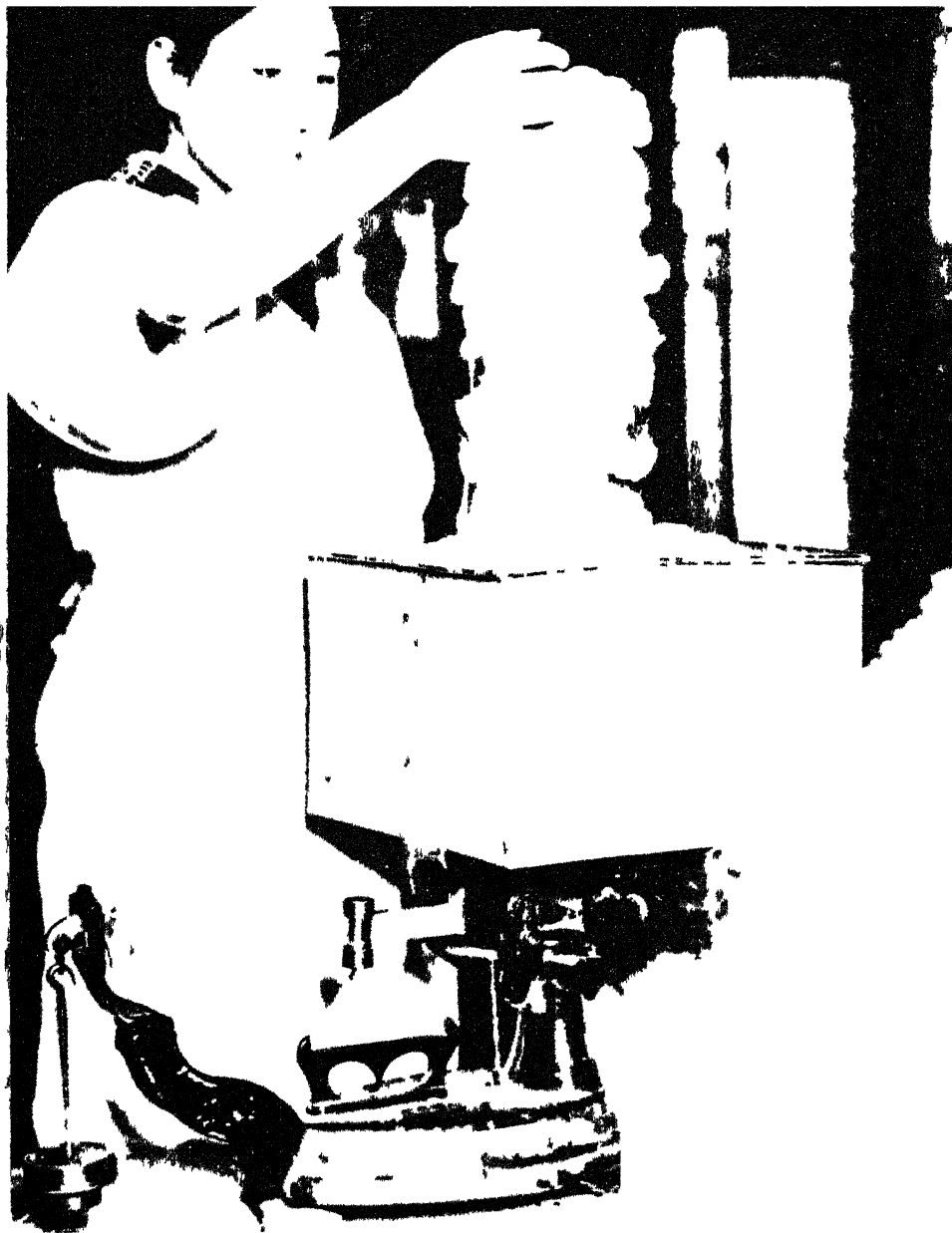


They are fed on freshly picked mulberry leaves in racked trays that often occupy most of the cocoon producer's house. (*International News.*)





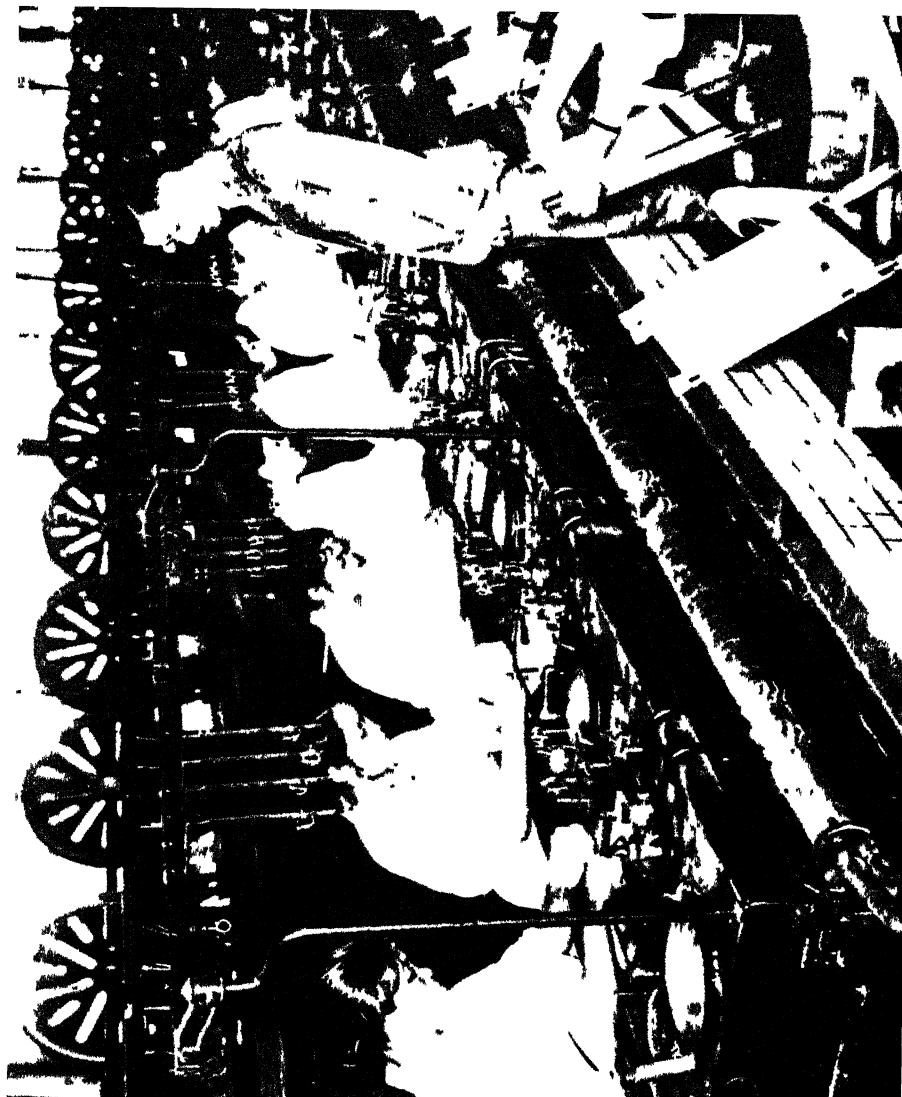
In thirty days the caterpillars grow to be almost three inches long. They are then provided with straw on which they spin their cocoons. Here the cocoons are being picked from the straw. (*International News.*)



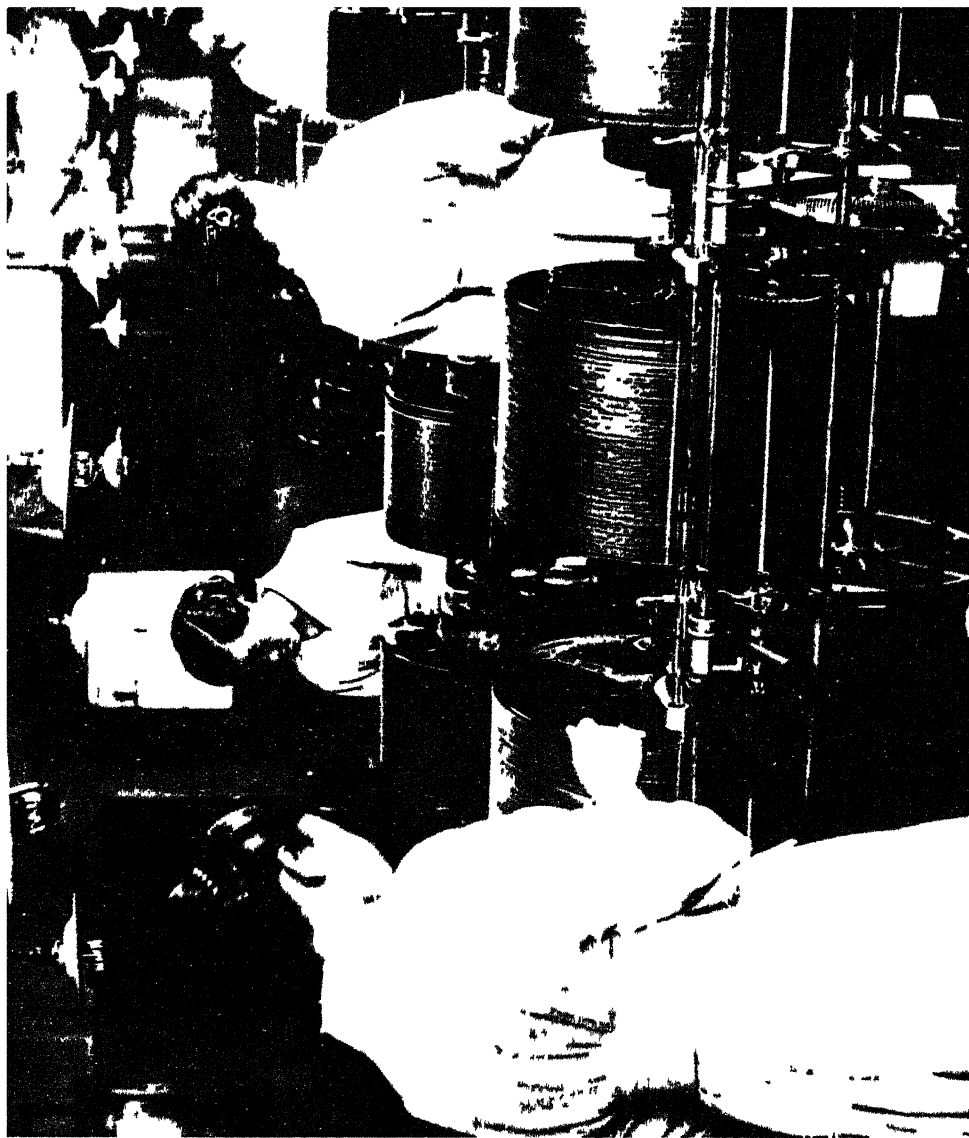
The cocoons are sold to the silk reel by weight. (W.C. Woolf)



Cocoons are soaked in hot water and the filaments are reeled off. Many reelers still use primitive equipment. (International News)



... but the majority of exported silk is handled by the comparatively few large modern reeling mills. The one above is the model plant at the Imperial Sericultural College, Tokyo. (*Acme.*)



These machines test silk filaments for evenness demanded by the American hosiery mills, the most lucrative pre-war market for raw silk. (Acme.)



Above (Acme)



Right (Wide World)

Here is the finished product, the raw silk of commerce that bought the machinery that first made Japan a great industrial nation and then launched her on a career of conquest.

mainland, Shimonoseki will be an extremely important port after the war.

**Moji.** *Population, 127,000 (1937).*

Moji, a great coal port of Japan, is the northernmost town on the island of Kyushu and lies directly across the straits from Shimonoseki, a railway tunnel connects the two. In 1937, 1,129,000 metric tons were shipped from Moji to Japan's industrial cities.

**Kokura.** Kokura is seven miles east of Moji. Its iron and steel production was valued at 60 million yen in 1936.

**Yawata.** Yawata, which is near Moji, is the site of the government-sponsored imperial steel works, which produces 80 per cent of Japan's pig iron, 40 per cent of her steel, and most of the heavy steel plate used in naval construction.

**Fukuoka.** *Population, 308,000 (1937).*

Fukuoka is the capital of the prefecture of that name, in which the above coal and iron cities are located. It is principally an administrative and commercial center. Hydroelectric resources nearby have been considerably developed.

#### OTHER CITIES

**Nagasaki.** *Population, 216,000. The historic port on the west side of Kyushu, and once the gateway to Japan for all foreign trade.*

Nagasaki has the deepest and one of the best natural harbors in Japan, but because its principal export was coal from neighboring mines its foreign trade dropped off sharply with the advent of oil-burning ships.

Nagasaki's chief industries are shipbuilding, marine engine and boiler making, iron and steel production, and some cotton, silk, and ceramic manufacture. The Mitsubishi shipyard, with three large dry docks, is the most important plant, the neighboring Akoura engine works is second. Both lie across the harbor from the city. Large naval units were produced at the Mitsubishi yard before and during the war.

**Kagoshima.** *Population, 188,000 (1937).*

Kagoshima is the major port of southern Kyushu. The surrounding country is chiefly agricultural, the produce was shipped to other ports in Japan and, to a limited extent, to the South Seas.

**Kanazawa, Toyama, Niigata.** *Population, 198,000 (1937), under 100,000 (1937), 139,000 (1937), respectively.*

Lying south to north as listed above, these cities are the three most important port cities on the Honshu coast of the Sea of Japan. Because they are located on the less favored "cold side" of the island, the population is small and until recently their commerce and industry were meager. Commerce from Asia passed through the Shimonoseki Straits and the Inland Sea to the great cities on the other side of the island. Although railroads were built across the mountains to these three cities in the nineteenth century, it is still far cheaper to ship goods around the island by water. However, some industries grew up after the development of mining and of Japan's few oil fields, and particularly after the more recent development of the large hydroelectric resources in this area.

Kanazawa produced silk and rayon textiles, gold foil, cotton yarn, distinctive earthenware, and inlaid art work.

Toyama was famous for its drugs in feudal times and is now an important production center for drugs and chemicals. Because the mountains nearby constitute the largest source of hydroelectric power in any area of similar size in Japan, a considerable metal and textile industry has sprung up there. However, more than half of the power produced locally is transmitted across the mountains to Nagoya, some going as far as Tokyo.

Niigata and the neighboring port of Kashiwazaki are the only cities in Japan that are largely dependent on petroleum. Japan's oil fields are situated in the hills behind them and crude oil from Japanese-controlled fields on the Russian half of the island of Sakhalin was shipped to their refineries. Other products of Niigata are cotton textiles, paper pulp, chemicals, and machine tools.

**Hakodate.** *Population, 211,000 (1937). The largest city and the principal port of the northern island of Hokkaido.*

The port of Hakodate commands the straits between Hokkaido and Honshu and has considerable commerce. There is some industry—shipbuilding, ship repairs, metal manufacture, and the production of lumber, woodenware, wood pulp, and paper. Fishing and the processing of marine products are of course of great importance both directly and indirectly in the city's economy.

Hokkaido has been called "Japan's neglected frontier." This is correct in the sense that the attention of the Japanese government, at one time so strongly concentrated on this island's development, has turned away from it from time to time. Sixty years ago the official policy called for the settlement of Hokkaido as the answer



to the problem of over-congestion in the rural areas in Honshu, but the Honshu peasants proved to be unhappy pioneers in a land too cold for rice. The official emphasis then turned to overseas migration and to manufacture for export in order to provide for the surplus rural population. Later the shift was toward migration to Korea and Manchuria, a vast increase in the armed forces, and finally to hemispheric if not world conquest.

However, the planned development of agriculture, industry, and fishing was never actually neglected. The usual busy government bureaus and agencies were studying and experimenting with all three while political and military attention was directed elsewhere. Detailed plans for the further exploitation of Hokkaido's still untapped resources have already been made and there has been considerable practical experimentation in agriculture, mining, fisheries, and certain types of manufacture.

With Japan stripped of her mushroom empire, the government's attention will again be focused on Hokkaido. Migration may be resumed on a large scale and all industries greatly expanded. If this occurs, Hakodate may double in size in the next ten years.

## IX.

# Commercial and Industrial Monopolies

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*Preliminary to any study of Japan's manufacture, foreign trade, and finance, it is necessary to understand something of the structure and scope of operations of the fifteen huge holding companies whose many subsidiary corporations transacted three-fourths of all of the country's business before the war.*

According to reports reaching the United States in January, 1943, the holdings of all or most of these monopolies were "nationalized" by imperial decree. That is, they were expropriated by the Tojo government, representing the militant nationalists and the dominant military clique. Both of these groups have long been enemies of the big corporations, first, because the latter habitually opposed the army's program of imperial expansion by military action in view of the expense involved and made consistent efforts to block increased army and navy appropriations in the Diet, and second, because the corporations represented private wealth, whereas the army factions and their allies were, in their own way, state socialists. These factions maintained that all wealth, or at least all productive wealth, is of its very nature the property of the Mikado, and its administration, like that of the political government, should be in the hands of those who had "access to the throne."

As the militant nationalists always claimed that they alone were fit to possess this "access," this meant that they were assigning to themselves the administration of the immense wealth and productive capacity of the fifteen great companies. Furthermore, the owners and the executive personnel of these monopolies were closely associated, first with the old Sat-Cho combine and the correlated *genro* which ruled Japan during the Meiji regime, and then with the political parties that controlled the Diet in later years—both of whom the militant nationalists maintained were "decadent" and "corruptive" and "gave bad counsel to the throne."

It must be remembered that the militant nationalists, whether civilian or military, were on the whole poor men; the overwhelming

majority were the sons of debt-ridden farmers and landowners. Therefore their movement may be said to have sprung from the people. Although they have suppressed labor unions and murdered liberals, socialists, and communists, they nonetheless were and are radicals. They had a large and growing popular support, particularly from the rural districts, for their campaign of assassination and intimidation against both labor and liberal groups and the capitalistic class, which in Japan was almost synonymous with the great monopolies. All the latter were held to be motivated by foreign and therefore impious ideologies, whereas the radicalism of the militants was considered native and therefore pure.

On the other hand the monopolies alienated the Japanese people by the same methods that made the American "trusts" notorious in the late years of the nineteenth and the early years of the present century. They were ruthless, grasping, and totally lacking in social consciousness until some fifteen years ago, when they began to make contributions to charities and to various organized benefit associations. But they did this very slowly, obviously because they were driven to it by the growing resentment against them.

These fifteen holding companies were all either closely held corporations or family partnerships. No part of their ownership was permitted to leave the hands of the descendants, actual or adopted, of the man or men who had established the firm. In many cases the administration long ago passed into the hands of a group of executive employees who received or were permitted to purchase large holdings in the subsidiary corporations. These employees could have no share in the holding company itself unless they were received into the owner family by adoption or marriage.

In this regard they were curiously like the daimiates of the feudal period that were administered by a group of samurai related to the lord not by blood but by loyalty born of long training, close association, and mutual interests. Candidates for administrative positions in most if not all of the big companies were selected when very young, usually through competitive examinations. They were trained by and for the firm, each one being carefully indoctrinated with the characteristic Japanese sense of "clan" loyalty just as were the samurai administrators.

Because the large companies offered better pay and better opportunities for young men of superior intelligence than the government's civil or military services, the corporations had first call on the

nation's administrative talent. The competition at the examinations was exceedingly keen. Many candidates ruined their health studying for them and there were many suicides. Only the ablest and sturdiest won places. Many of them became rich, some became millionaires.

Thus the monopoly exercised by the great Japanese corporations extended over administrative skill. The government, even the army and navy, had to borrow or requisition administrative personnel from them.

For this reason it is doubtful if the Tojo government in its "decree of nationalization" in 1943 did more than take over the revenues that these holding companies regularly paid to their owner-families. Any active interference with their administration or organization would mean a radical decline in Japan's total industrial output.

However, the news dispatches coming through Berlin indicate that there was a considerable reorganization of the entire banking and financial structure in Japan. This could well be, for the Bank of Japan—owned in part by the government and in part by individuals associated with the big companies, and managed and staffed by the latter's personnel—and the Yokohama Specie Bank, similarly owned and administered, may have taken over all the functions of the various banks, trust companies, and insurance companies that were owned by the fifteen large firms.

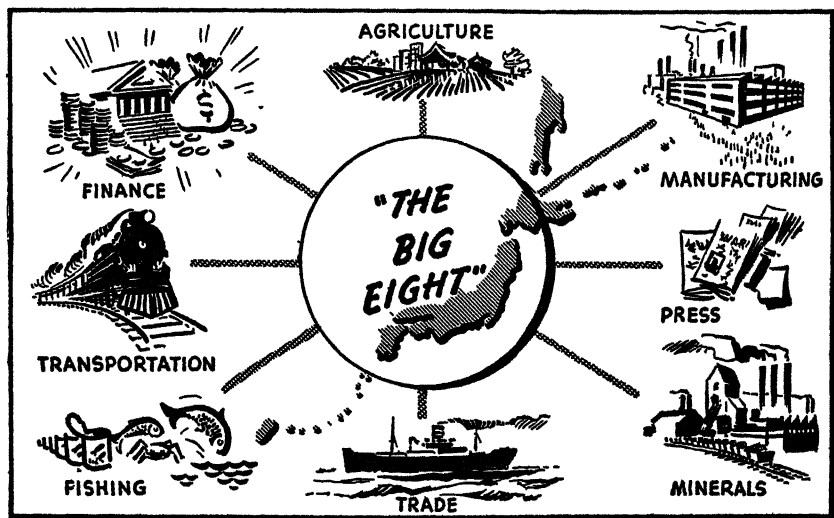
It must be remembered that the "Big Names," as they are often referred to in Japan, and their wealthy executive personnel owned and controlled practically all the nation's fluid capital, and therefore the entire country including the imperial government was in debt to them. There is no investing public in Japan as we know the term in America. The ordinary Japanese citizen put his small savings in a bank or trust company, or in life insurance. He did not have the money to buy stocks, or even the 100-yen government bonds, worth less than \$25 in our money.

The "Big Names," or the corporations controlled by them, owned nearly all the government securities, national and local, until the forced-savings edicts were promulgated just before World War II. Hence if there is any radical liquidation of Japan's debt structure after the war the loss will be theirs. Or, by the act of the Tojo government in taking over the firms, it will be the imperial treasury's.

Parenthetically, the Tokyo, Osaka, and Nagoya stock exchanges

were for all practical purposes operated by and for the "Big Names." Only these concerns, their subsidiaries, and their upper-bracket employees did any appreciable amount of buying and selling on the exchanges.

The fifteen "Big Names" were usually divided into what was colloquially called the "Big Eight" and the "Lesser Seven." There is considerable disagreement as to whether some of the firms belonged



in the first or the second category, but there is general agreement that the "Big Eight" transacted more than one-half of Japan's total business, internal and foreign, and that the "Lesser Seven" handled another quarter.

The greatest of them all was the Mitsui Gomei Kaisha, a holding company that owned at least two-thirds of the voting stock, either directly or through the control of intermediate companies, in some 125 corporations said to transact nearly 15 per cent of all the country's business.

The parent company was owned by heads of the seven branches of the Mitsui family, all descended from Hachirobei Mitsui, a silk merchant and moneylender who became a fiscal agent for one of the Tokugawa shoguns in 1690. While only a Mitsui could be a partner in the parent company, its actual management has for two generations been in the hands of hired executives, trained in the

company, who could own no part of it but who did have extensive interests in the various corporations it controlled. These included the Mitsui Bank, Ltd., the Mitsui Life Insurance Co., Ltd., the Mitsui Trust Co., the Mitsui Bussan Kaisha—itself a gigantic holding company that controlled more than 30 manufacturing, shipping, and trading concerns making and dealing in steel, silk, cotton fabrics, drugs, and poultry feed; together they conducted more than 40 per cent of all of Japan's export business—and about a dozen others, each of which controlled from one to 20 companies. One of the latter owned the controlling interest in several important newspapers and periodicals.

The Mitsubishi Goshi Kaisha (Mitsubishi Company, Ltd.) was the property of the Iwasaki family, whose titular head was in active management when the war began. It was second to the Mitsui organization in the scope of its activities and in the number of corporations it controlled. In bulk of business it was said to be slightly smaller than the Mitsui company. Exact data on the total transactions of either concern never were obtainable. The capitalization of the parent organizations was set at a nominal figure—100 million yen for Mitsui, and 120 million yen for Mitsubishi. In 1939 the *Japan Times* published a statement that the Mitsubishi interests "represented an investment of five hundred million yen"; this was probably very conservative.

The history of the Mitsubishi Company is interesting. Originally it was a trading company of the Tosa daimiate. When the feudal privileges of the provincial lords were abrogated the vice-councilor of the Tosa domain, Yataro Iwasaki, took the trading company over as his own property, probably in lieu of other payment for the loss of his samurai pension. In 1875 he received a mail contract from the imperial government and began to operate the government shipyard at Nagasaki. He died the next year. In 1895 his heir made a deal with the government to buy foreign shipping to transport Japanese troops to Formosa. At the successful conclusion of the campaign these ships became the property of the newly organized Mitsubishi Goshi Kaisha. This is one illustration of how successful pioneering in commerce and industry was subsidized by the government.

The multiple interests of the parent concern have been regrouped several times and at the beginning of the war they were much more closely coordinated than those of Mitsui. According to last reports, there were the following eight principal Mitsubishi subsidiaries:

The Mitsubishi Heavy Industries, Ltd.

Shipbuilding, dry docks, engines, motors, and aircraft manufacture.

The Mitsubishi Warehouse Co.

Customs brokers, stevedores, etc.

The Mitsubishi Trading Co.

Included the great N.Y.K. shipping lines.

The Mitsubishi Mining Co.

Included iron and steel manufacture.

The Mitsubishi Bank, Ltd.

The Mitsubishi Electric Manufacturing Co.

The Mitsubishi Trust Co.

The Mitsubishi Estate Co.

An extensive operator in real estate at home and abroad.

It is generally agreed both by the Japanese and by foreigners who were in business in Japan that the Mitsui and Mitsubishi interests conducted about a quarter of all the nation's business, both foreign and domestic. The remaining six firms of the "Big Eight" handled and shared somewhere between 25 and 30 per cent of the business.

The largest of these was the Sumitomo Goshi Kaisha, with paid-up capital of 150 million yen. It was the personal property of Baron Kichizaemon Sumitomo, who for several years paid the largest personal income tax in Japan. He had only a minor share in the management of the corporation, however, the control being in the hands of the usual board of executive employees, all of whom had extensive interests in the twelve principal subsidiary companies. It is notable that one of these, the Sumitomo Metal Industries, Ltd., was capitalized at 200 million yen—a third more than the parent company. "The business of this company is the production of munitions and engines of war," says one Japanese account.

The Sumitomos were provincial nobles of Shikoku Island. When extensive copper deposits were discovered on their land in 1690, they were immediately developed with the aid of European technical advisers. The Besshi mine is still one of the holdings of the company's mining subsidiaries. As late as 1933 it produced nearly half a million tons of ore from which were extracted 13,000 tons of electrolytic copper, over one ton of gold, and 10 tons of silver. As these three metals were Japan's principal articles of export during the

long years of the Tokugawa isolation, the Sumitomo family acquired an unusually large capital reserve for the time, and established an experienced organization of the typical "clan-company" type that was well equipped to take advantage of the era of great industrial expansion in the late nineteenth century, when it branched out into finance, industry, and foreign and domestic commerce.

Just before the war the Sumitomo Goshi Kaisha controlled 5 mining companies, 5 companies in metal trades, including the largest aluminum-producing unit in Japan, a bank with 20-odd branches in Japan and 3 in the United States, a trust company, an insurance company, and several other organizations, some producing hydro-electric power and others engaged in building, shipping, warehousing, and forestry. It even owned a large hospital in Osaka, the city in which the headquarters of all these organizations are located.

Probably next in size was the Yasuda Hozensha Kaisha, the property of the famous Yasuda banking family. This firm controlled 30 corporations in 1938, most of them in the banking, trust, or insurance business; but like many of the "Big Names" it has not been able to keep out of the textile trade, which has been Japan's principal source of overseas revenue since the First World War.

Its biggest subsidiary was the Yasuda Bank, Ltd., capitalized at 150 million yen. The life insurance concern of the same name was second with a capitalization of 125 million yen. In the manufacturing field there were the Imperial Flax Company and the Nippon Paper Company.

The Kawasaki interests were usually listed as seventh in the "Big Eight," but after 1937 their production grew enormously. They controlled three big industrial corporations. One of them, the Kawasaki Dockyards Co., Ltd., operated a shipyard and marine engine factory at Kobe which was possibly the largest in Japan; at least it was rivaled only by the Mitsubishi yard on the other side of the harbor. It also controlled two steel mills in the same city, as well as the Kawasaki Locomotive and Car Company, the Kawasaki Aircraft Industries, and the Kawasaki Shipping Lines.

Because their expansion was so closely tied in with Japan's war effort, it is impossible even to estimate the extent or to determine the number and nature of the numerous subsidiary corporations under Kawasaki control during the period just prior to the war.

The other firms usually listed in the "Big Eight" were the Yamaguchi Goshi Kaisha, the Konoike Gomei Kaisha, and the Shibusawa



Dozoku K.K. The first two are banking and investment companies with headquarters in Osaka; they controlled a wide variety of manufacturing and commercial establishments in that city and elsewhere. Because neither one has publicized its activities, it is difficult to determine just how far their numerous ramifications extended, though it is known that both of them exercised some degree of financial control over a number of firms not listed as their subsidiaries.

The Shibusawa Dozoku Kabushi Kaisha, with headquarters in Tokyo, is the property of a noble family of the same name. It controlled the Fuji Steel Company, the Ishikawajima Shipbuilding Co., the Ishikawajima Aircraft Co., and the Automobile Industries Co., as well as a number of minor concerns. This is another of the industrial titans that has been little publicized and may well have been too important for the eighth place usually given it in the list of "Big Names." It was the leading rival of the Mitsui and Mitsubishi interests in the metal trades. Whether or not it surpassed the Kawasaki firm in that field in the late pre-war years cannot be determined because both were principally engaged in war production.

As has been said, some of the "Lesser Seven" may have actual control of a greater volume of business than some of the "Big Eight." The "Lesser Seven" are usually listed as the Nomura, Okawa, and Okura banking families, each controlling a holding company that dominated an amazing variety of establishments, the Ishihara Sangyo Kaiun Kaisha of Kobe, the Yamashita fuel and shipping interests; the Asano Bussan Kaisha, which was the Japanese Cement Trust but controlled much other manufacturing as well as shipping; and last but far from least, the Kuhara interests. This last controlled mines and steel mills, were the second largest owners of oil wells in Japan proper, and operated the Hitachi engineering works, with large factories in Ibaraki, Tokyo, and down on the Inland Sea, all turning out electrical equipment which ranged in size from toasters and fans to hydroelectric generators and locomotives, as well as mining machinery.

Between 1937 and 1939 three corporations were organized to exercise a virtual monopoly of the exploitation of Japanese conquests in northwestern Asia. They were the Manchuria Heavy Industries Development Company, the North China Development Company, and the Central China Development Company. The first was entirely financed by Japanese capital, which meant, in effect, by the fifteen big corporations; the other two, largely by the same

sources but with Chinese financiers contributing. In every case the executive personnel of the parent company was Japanese—men trained by large corporations at home—though some of the executives of the subsidiaries were Chinese. All of these concerns were heavily capitalized, some of the subsidiaries for 100 million yen. Their organization followed a pattern similar to that of the Japanese holding companies. Their business, particularly in coal, iron, steel, and electric power, grew enormously during the war but in no case approached that of the great corporations in Japan proper.

No matter what action the Tojo government has taken in regard to these companies during the war, and in spite of the fact that a considerable number of their trained personnel have been lost as a result of the war, these firms, or at least the portion of their personnel and organization that has survived, will certainly be in a position to play an important part in the economic reconstruction of Japan. They had the leading role in the phenomenal growth of her commerce and industry. That they built an industrial Japan at the expense of a large part of the population is undoubtedly true, and it is also true that they put up little coordinated opposition to the military extremists and finally acquiesced in all their demands. But it must always be borne in mind that the men in these organizations are practically the only able business administrators in Japan and they form the only important group that has any clear knowledge of the world beyond those islands.

## X.

### Finance

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*Fifteen years ago the Japanese government joined the sisterhood of nations that enjoys the dubious advantage of always spending more than its income. For the three-year period ending in 1941 the Japanese budgets provided for deficit spending in excess of 4 billion yen. Such deficits were absorbed by yen loans to the public and served to bring the internal funded obligations to 23 billion yen. Certain local loans to subdivisions amounted to 4 billion.*

There are eleven types of internal loans, in part classified by interest rate differentials. The average interest paid is 4½ per cent. In addition, Japan has nine external loans including five British, two United States and one French, whose average rate is 5 per cent and whose total burden is 1¼ billion yen. Thus the total national and local debt burden in 1941 was over 28 billion yen, a sum greater than the estimated annual national income.

It should be emphasized further that the total national wealth of Japan proper is only 110 billion yen, of which private property constitutes 84 per cent, government property 12 per cent and public property 4 per cent, the latter classification representing non-productive property such as parks, recreation grounds, public roads, a part of the forests, and the like.

In the absence of more recent data we may safely estimate that the years 1942 and 1943 have added 14 billions of internal debt to the total and so established a burden of 42 billion yen, an amount nearly twice the probable national income for either of those years. The average Japanese citizen owes 520 yen as his share of the national debt, besides the private obligations he must meet from his meager income.

The mounting deficits of government finance have been reflected in the currency. The coinage law of 1897 gave the yen a gold content of 750 milligrams, almost exactly one-tenth the weight of the British pound sterling to which it was geared. Its mint parity for the next twenty years continued to be maintained in the exchanges at

49 cents, United States currency. When, in 1933, the gold stock of the entire world was revalued by the Rooseveltian device of purchase at \$35 per ounce, the yen exchange should have been established at 82 cents.

On the contrary, and as with most other currencies, the exchange moved downward. Only one year after revaluation the yen was quoted at 30 cents and in two years at 24 cents, if such quotations were available, the yen would certainly not exceed 16 cents. Even the foregoing figures are probably only nominal, inasmuch as Japan established an exchange control board in 1932, which means that any yen valuations have been "pegged" since that date. An interesting phase of this currency depreciation is represented in the Chinese coastal cities where Japanese authority has been content to permit the yen to find its own market level and where, by the device of employing dollars to purchase Chinese currency and buying yen with the latter, the end price of the yen has varied between 5 and 8 cents.

Through the Bank of Japan, to be discussed below, the government adopted the "last ditch" procedure in currency manipulation, namely, an increased note issue of half a billion yen, without appropriate or, indeed, any additional reserves. This occurred in 1939; there was a further increase in 1942, but of unknown proportions.

Also, as early as 1938 the shortage of silver and gold resulted in the use of aluminum coins to replace subsidiary silver. Finally, even the copper 1-sen coin was displaced by aluminum and the 50-sen silver unit was displaced by paper currency. Since 100 sen equal 1 yen, the value of a 1-sen piece has not been over one-fifth of an American cent.

The Japanese government secures its income from twenty-seven tax categories, plus public borrowing. The largest source of funds is these loan operations, which yielded about 2 billion yen in each of the two years before Pearl Harbor.

As early as 1938, in order to tap greater reserves of citizen purchasers, bonds of a denomination of 10 yen were issued. There is an extensive group of government obligations comparable to our own War Savings Stamps. Not far behind are the revenues from the income tax. A special profits tax provides half a billion yen in revenue; profits from government enterprises, such as the tobacco and other fiscal monopolies, are next in order, followed by the liquor tax, sugar tax, commodity tax, and, in peace years, custom duties.

There are numberless taxes of a special nature, such as the impost on foreign securities, this consists of a 70 per cent levy on the sum remaining after deducting 4 per cent interest on the face value of such securities. There is a gross tax of  $1\frac{1}{2}$  per cent on business transactions, and a corporation tax based on a composite of capital, surplus, and net profits that averages 18 per cent. Reference has been made elsewhere to land taxes.

Some specimens of the personal income tax burden may be enlightening. Since Japanese tax procedures are even more involved than ours, the following figures are designated as "composite":

#### COMPOSITE INCOME TAX

5,000 to 8,000 yen	. . . . .	10 per cent
12,000 to 20,000 yen	. . . . .	20 per cent
80,000 to 120,000 yen	. . . . .	40 per cent
200,000 to 300,000 yen	. . . . .	50 per cent
over 800,000 yen	. . . . .	60 per cent

As these figures indicate, the Japanese income tax is considerably less progressive in the upper brackets than its counterpart in the United States.

**Banks.** The following classification may serve to simplify the complex banking structure of the Japanese economy:

- A. Quasi-government banks
- B. Private banks
  - 1. Domestic ownership
  - 2. Foreign ownership
- C. Government banks
- D. Mutual banks
- E. Trust companies

*Quasi-Government Banks.* There are only two organizations in the first category: the institution known as the Bank of Japan, and the Nippon Kogyo Ginko or Industrial Bank of Japan. The first is owned jointly by the wealthy imperial household and a handful of civilian financiers whose interests slightly exceed those of the household; moreover, the latter are representatives of the large private banks. The Bank of Japan manages all the receipts and disbursements for the imperial treasury and is the sole bank of issue for every type of government financing, including the nation's note and coin money. Among its other functions are rediscounting, fixing

rediscount rates to conform with government policy, receiving deposits from and making discount loans to other types of banks, managing loan drives for the treasury, and distributing state security issues. It has paid 10 per cent dividends for more than two decades, and has accumulated a surplus as well.

The Industrial Bank is a subsidiary arm of the treasury because it is specifically designated to underwrite national and prefectural bonds as well as to perform its original function of underwriting the debentures of private industrial enterprises. Its dividends are fixed at an annual rate of only 6 per cent.

*Private Banks.* As respects ownership, private banks are either domestic or foreign; of them, the former are vastly more important. There are actually only 11 Japanese-owned private banks as respects the parent units. First in the picture are the "Big Seven." Each of them is intimately tied up with the big family-owned holding companies.

Representing an amalgamation of three former private banks is the Sanwa, which is the first bank in Japan as regards total assets, second in paid-up capital, first in deposits, and sixth in profits. Yasuda is second in total assets, first in paid-up capital, third in deposits, second in loans, and fourth in total profits. The Dai-Ichi is third in assets, sixth in capital, third in loans, and first in profits. Sumitomo is fourth in assets, fifth in capital, second in deposits, first in loans, and fifth in profits. Mitsui occupies fifth place in assets, fourth in capital, and second in profits. Mitsubishi is sixth in assets, third in capital, and third in profits. Daihyaku (known as the One Hundredth Bank) is seventh in assets, capital, and profits. Nevertheless, it is noteworthy that so big and powerful are all seven of these banks that no one of them is twice as great as another in any category of activity.

There are four other domestically owned banking institutions with special characteristics. First of these is the Hypothec Bank; it is the nation's central banking institution for mortgage operations and makes loans on immovable property and also issues savings certificates. It has long declared 10 per cent dividends annually.

Closely allied with it is the Noko Ginko, or Agricultural and Industrial Bank. In reality, this organization is composed of multiple branches which act as *de facto* agents of the Hypothec Bank. Operations result in an average annual dividend of 8 per cent.

Another private bank is the Hokkaido Colonization Bank, which

specializes in loans to colonizing farmers in Yezo and takes mortgages on crops for security. Although this is a small venture, judged by many institutions of a financial character in Japan, its dividend rate is 7 per cent.

Last of the private banks under domestic ownership is the Yokohama Specie Bank, whose activities within Japan proper are restricted to foreign exchange operations in behalf of their own interests as well as for all the other Japanese-owned banks in the empire. It had a total of fifty-four branches located in every continent but Africa. Because the imperial household has a fractional ownership in the institution, this bank might logically be included under quasi-government agencies as well as private.

Besides these eleven institutions there were, until January, 1942, eight private banks whose ownership was exclusively or dominantly foreign. Two British banks, the Hongkong and Shanghai and the Bank of India, had a total of five branches in Japan. The National City Bank of New York City had four branches. There were also two Dutch banks with three branches, a French bank with two branches, the Bank of China, and the Central Bank of Manchuria.

About five-eighths of the total business transacted by financial institutions in the four islands passed through the hands of the private banks mentioned above. So far as Japanese-owned enterprises are concerned, the great family trusts were the principal owners of all of them as well as of those operated under their own names.

*Government Banks.* The only exclusively government-owned and -operated bank was the Postal Savings, which in 1940 had 46 million depositors and deposits of 6 billion yen. We are justified in viewing this figure for total depositors with some suspicion inasmuch as it exceeds one-half of Japan's total population. No one may deposit more than 2000 yen.

*Mutual Banks.* There are a great number of cooperative financial enterprises in Japan, but their over-all importance is nevertheless far below that of the private institutions.

The Mujin Kaisha, or Mutual Loan Company, is composed of 245 units whose subscribing members make deposits and then draw lots or make bids for loans of the mutual funds. Some 125 million yen are outstanding in loans.

The Cooperative Credit Association has 280 member societies. It makes small loans to anyone, giving preference to members, but it

issues no farm loans whatever. In the larger cities the societies are known as the People's Bank.

Significantly Japanese is the Sangyo Kumiai Chuo Kinko, or Central Chest for Cooperative Associations. It has over 13,000 member associations, and is specially active in fishery associations. It is the largest enterprise of its kind in the country.

A smaller replica is the Central Chest for Commerce and Manufacture Associations, whose operations are confined to household handicraft groups. The People's Chest, or Shomin Kinko, is a co-operative. Since its financial statement is not given in the *Japan Yearbook*, it must be a small organization.

*Trust Companies.* The trust companies, twenty-eight in number, with eighteen branches additional, are largely the property of the great corporations. They are usually described as being unlike our American trust companies, which is accurate in a restricted sense, for these enterprises not only conduct a regular trust business, as ours do, but they also specialize in safe deposit facilities, debt guaranty, sales agency, loan agency, will making, public auditing, and debt collecting. These twenty-eight houses had assets of 2½ billion yen in 1941, of which more than half represented funds held in trust, comparable to the procedure in American trust concerns. Most of their operations involved loans of trust funds to industrial enterprises on mortgage terms.

By 1940 there were almost 100 insurance companies, nearly all of which combined casualty and life insurance functions. Fire insurance is of major moment in Japan, thanks to the prevailing type of construction. The face value of most policies is so small as to be ludicrous, but apparently it pays to issue them.

In summary, there were 423 banks in 1941, a reduction of 140 in the space of five years, this was typical of the financial concentration found in the country. This number will be subject to further reduction and amalgamation in post-war Japan when duplicate offices and personnel will have to be eliminated to put the nation back upon its production path.

Capital represented by all banks was over 2 billion yen in 1941, of which 1½ billion was fully paid up. Their reserves totaled over 1 billion yen, and total deposits, including government funds, amounted to 23 billion yen.

In the summer of 1943 the Tojo government issued a statement,



·giving no pertinent details, to the effect that the whole Japanese banking structure had been revised or merged, and a government-sponsored "Great Number One Bank" had been established to control the entire financial system of the empire. The importance or permanence of this move cannot be determined at this time.

## XI.

# Foreign Trade

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*Prior to the 1930 depression and in the years immediately preceding the outbreak of the European war in 1939, Japan was fifth nation in the world in foreign trade, being exceeded by Great Britain, the United States, Germany, and France. During the depression years and in 1940 and 1941, Japan's overseas trade passed that of Germany and France. In 1940 her commodity foreign trade exceeded \$2,000,000,000, or about \$30 per capita, nor did this include the enormous trade between Japan proper and her dependencies and occupied territories. Neither did it include her trade in those intangibles called "services" to foreign countries.*

Since the beginning of her modern commercial history Japan has bought more goods abroad than she sold, but her sales of services—shipping, banking, forwarding, insuring, and the like—have consistently amounted to about twice what she has purchased from foreign nations. Normally her annual net income from these sources exceeded 150 millions, and thus wiped out the unfavorable commodity balance that persisted year after year. For this reason the statement so often made that "Japan's trade balance is unfavorable" is misleading. Properly stated, Japan—like Great Britain—had an import trade balance rather than an export trade balance as regards commodities. Furthermore she followed the practice of nearly all the countries except the United States in valuing all imports at the port of destination, thereby including freight and insurance charges, which were often a matter of 10 to 20 per cent of the total, as enhanced value of the goods. If her imports were valued according to the American practice, her import balance would appear substantially smaller.

These facts dispel the opinion, held by many uninformed people, that Japan's overseas trade has always been a losing proposition maintained by government subsidy because of some nebulous and probably sinister reasons of state. The country's constantly increasing burden of debt was due not to the unbalanced foreign trade but

to the maintenance of huge military and naval establishments and a very expensive attempt to maintain self-sufficiency in certain types of industrial production in order to meet the requirements of those establishments.

One fundamental fact should be borne in mind. Japan has always, in the last analysis, exported the labors of her people because of her comparative poverty in raw materials, her abundant population, and her strategic position on the north Pacific trade routes. Her exports must of necessity continue to be laboriously processed products, and her principal imports the goods that lend themselves to such processing.

**Imports.** In 1937, at the beginning of the undeclared war against China, Japan ceased the publication of statistics on imports of mineral oils, ores, metals, firearms, explosives, certain types of chemicals, automobiles, machine tools, and certain types of machinery. Only the totals are complete for the year 1940, but the scope and pattern of most of her imports for that year can be ascertained from the reports of the exporting countries. Nearly all of her imports in 1940 consisted of:

- |   |   |
|---|---|
| 1. Raw fibers (principally cotton and wool) | 6. Timber and wood products   |
| 2. Ores and metals                          | 7. Machinery (Japan imported more than 50 million dollars' worth that year) |
| 3. Oils, fats, and waxes                    | 8. Rubber   |
| 4. Coal, oil, and other fuels               | 9. Oil cake and oil seeds   |
| 5. Foods                                    | 10. Chemicals   |

Significantly, although this was the year before Japan made her long-planned attack on the United States and she was buying up vast stores of food for her army, her imports of foodstuffs were only 5 per cent of the total. This shows the great productivity of her agriculture in the face of its tremendous economic handicaps. Otherwise the pattern of Japan's imports closely approximated that of other highly industrial nations such as Great Britain, Belgium, and the Netherlands, the typical import pattern of a country that makes its living processing imported raw materials for resale abroad.

Although Japan's armament program increased the amount of purchases in some categories, the pattern was not greatly altered from that of normal years, and it will remain much the same in the future so long as the 70,000,000 Japanese support themselves on their home soil. Any economic program carried out by occupation

forces or a treaty commission must take this fact into consideration.

The United States has been the chief source of Nipponese imports for forty years, the percentage in our favor growing steadily until in 1937 we supplied just over one-third of the total. There is no reason why this volume should materially decrease when Japan is defeated. India held second place as a source in 1937; she furnished about one-eighth of Japan's purchases, consisting chiefly of the very short staple cotton for which Japan has been almost the sole market. Whether this continues depends on the fate of Japan's textile trade. ✓ China, excluding Manchuria, was a close third. Then, in order, followed Germany, Australia, the Dutch East Indies, and Malaya, each

#### JAPANESE IMPORTS, RECENT PRE-WAR YEARS: SOURCES AND ITEMS

United States	Cotton, copper, nitrates, petroleum products, lead, potash, borax, sillimanite, phosphates, automobiles, trucks, wheat, asbestos, tin plate, scrap steel, ferro-alloys, synthetic dyes, motion picture film.
China	Coal, egg albumen, bristles, honey, grass fiber, tungsten, kaolin.
Canada	Pulpwood, lead, wheat, asbestos, nickel.
Indo-China	Coal, rice, condiments.
Manchuria	Coal, iron ore, pig iron, steel plates and rods, soybeans, live beef, gold.
Brazil	Cotton, wax, skins, cocoa, fiber.
India	Cotton, rice, pig iron, jute, hides, skins.
Egypt	Cotton.
Australia	Wool, wheat, wattle bark, chilled beef.
Korea	Rice, gold, silver, magnesite, bauxite, coal, live beef.
Chile	Nitrate of soda, copper.
Philippines	Manganese, iron ore, coconut oil.
Dutch East Indies	Petroleum, coconut oil, sugar, tobacco, crude rubber.
Straits Settlements	Rubber.
New Zealand	Mutton.
Great Britain	Refined tin.
Union of South Africa	Wool, wheat.
Argentina	Wool, corn, linseed.
Formosa	Sugar, rice, bananas, tea, softwoods, camphor, molasses, pineapples, industrial alcohol.
Germany (normally)	Film, lenses, potash.
38 other countries	Smaller volumes of still more diverse products.

of which exported 50 million dollars or more of goods to Japan in 1937. Great Britain, Canada, and South Africa supplied 25 millions each, and the Philippines and Brazil lesser amounts. It should be noted that imports from Japanese possessions and dependencies in Asia—Korea, Manchuria, Formosa, and Karafuto—are not included in the above compilation.

In any estimate of future imports China will have a dominant place. Not only will she control much of the territory that was in Japanese hands in 1937, but her position is so favorable that if the artificial blocks and props to international trade are removed, no other country will be able to compete with her for Japan's trade in several types of raw materials, namely, low-grade wool, low-grade leaf tobacco, certain types of cotton, soybeans, and possibly coal and iron ore. The United States will certainly be second to China, but with substantially the same total sales as in the past because we will supplant Europe as a source of many imports. Here again it is a case of favorable geographic position, plus the certainty of immediate supply. The other nations will probably maintain their pre-war positions.

**Exports.** In 1940 Japan's exports were much smaller than normal, partly because her industry was already on a war footing, partly because of various restrictions placed upon them by importing countries and an informal but widespread purchasers' boycott against Japanese goods. However, the export pattern was not greatly changed from that in the last normal (or near normal) year, 1937. The ten leading categories were:

- |   |                      |
|---|----------------------|
| 1. Fabrics (cotton, rayon, silk)                                  | 6. Chemicals         |
| 2. Textiles (raw silk, woolen yarn, cotton yarn)                  | 7. Pottery and glass |
| 3. Foodstuffs—mostly canned fish, crabmeat,<br>and canned oranges | 8. Wood products     |
| 4. Machinery  | 9. Knitted goods     |
| 5. Iron and steel   | 10. Inedible oils    |

Fabrics and textiles amounted to more than half the total, and exports of machinery, iron and steel, and chemicals each ran higher than 50 millions in American dollars. Exports of the remaining five items were all above 20 millions for the year.

With exports as with imports, the pattern shows Japan's high state of industrialization. Every product exported in quantity has been subjected to processing, and in most cases to complicated or

## JAPANESE EXPORTS, RECENT PRE-WAR YEARS: ITEMS AND DESTINATION

Cotton piece goods	Straits Settlements, Netherlands, East Indies, Manchuria, Korea, Siam.
Raw silk	United States, Great Britain, France, Germany, Switzerland.
Rayon	Brazil, Chile, Ecuador, East Indies, West Indies, Panama.
Fish products	United States, Manchuria, Australia, New Zealand, South Africa, Great Britain.
Iron and steel	Manchuria, East Indies, China, Siam.
Cotton knit goods	Mexico, East Africa, East Indies, Indo-China, Philippines.
Silk piece goods	Netherlands, East Indies, Malaya, India, Latin America.
Pottery	United States, Canada, Australia, South Africa.
Electrical appliances	China, Manchuria, United States, South America.
Chemicals and drugs	United States, Canada, Great Britain, India, Australia.
Vegetable oils	Denmark, Germany, Italy, Australia, South Africa.
Paper and cardboard	Latin America, East Indies, China, Indo-China.
Woolen piece goods	Siberia, Manchuria, North China, Ethiopia.
Copper and brass	East Indies, Korea, India, South America.
Wood products	China, United States, South America, Australia, New Zealand.
Wire and cable	South America, Philippines, West Indies, Siam.
Rubber tires	Manchuria, East Africa, East Indies, Malaya, Korea.
Bicycles	China, East Indies, Korea, Indo-China, India, Mexico, Peru, Salvador.
Hats and caps	East Africa, Brazil, Indo-China, United States, Germany.
Cement	Manchuria, China.

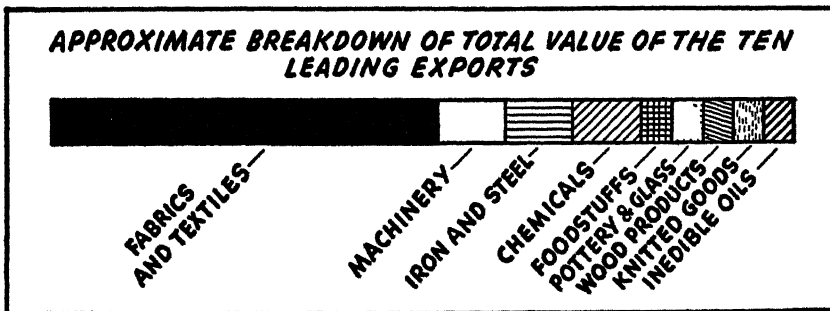
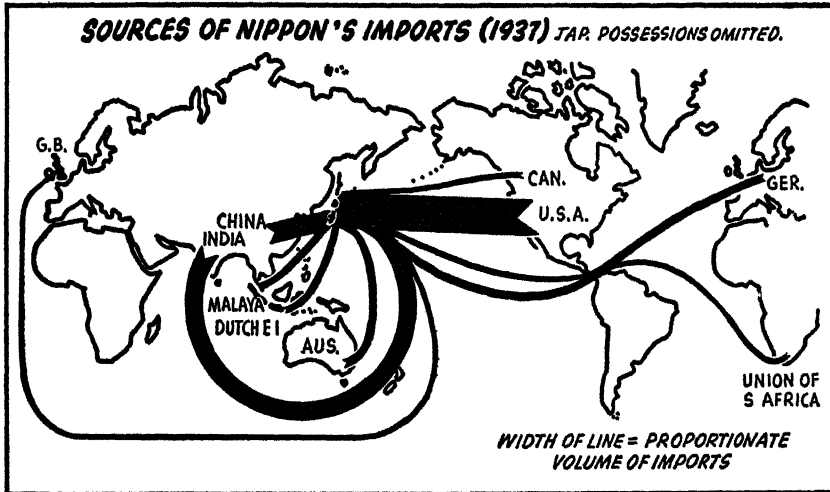
laborious processing, or both. Even raw silk, as we saw in the chapter on animal husbandry, is produced by a series of intricate processes requiring considerable knowledge and skill. Thus it is demonstrated that Japan's basic export has been labor, labor endowed with pronounced technical skills.

China has always been Japan's best market, as is inevitable from her location. Then followed the United States, the Dutch East Indies, Manchuria, and Great Britain. Australia, Malaya, the Philippines, and South Africa were minor markets.

By continents, Asia bought half of Japan's exports, North America one-quarter, and Europe one-eighth; the rest went to Africa, South

America, and Oceania, in that order. Asia, particularly China, will absorb an even greater percentage of Japanese exports under a system of free economy; China's buying power will be vastly increased

## FOREIGN TRADE



by the prosperity that will result from the first period of peace and firmly established internal order that she has enjoyed in a century. What will happen to Japan's market in America depends on several factors as yet unknown—whether or not natural silk can compete with the new synthetics; whether Japan can find an export product to take the place of the crabmeat she obtained in Russian waters, in case the U.S.S.R. cancels her fishing privileges; and how long Americans will remain firmly antagonistic to Japanese goods.

Japan's exports to the Indies are bound to increase if and when the buying power of the population increases. Not only is proximity in Japan's favor in this trade, but the relatively low initial cost of

articles made in Japan makes them available to very low-income groups that have never been able to afford the more durable American and European products.

Japan's huge and continually expanding trade with the so-called "yen-bloc" countries during the period before the war was largely a by-product of her military policy. Part of this trade—that with Sakhalin, Korea, Formosa, and the mandated islands—was journalized as domestic trade, whereas that with Manchuria, occupied China, and Inner Mongolia—countries maintaining a fictional independence—was characterized as foreign trade. Altogether, these transactions exceeded half a billion dollars annually in commodities alone, with Japan selling more to her dependencies than she bought from them. But statistics on these sales are highly unreliable in many instances. Furthermore, the great bulk of these commodities went either directly to government agencies or to government-sponsored corporations engaged in building communication and administrative facilities or providing productive capacity, often uneconomic, designed to give Japan imperial self-sufficiency in essential war products. All she built will be lost to her when she is defeated, and therefore has no place in a book dealing with her resources.

In summary we may add that, in spite of an expansion of foreign trade that has been the marvel of the modern world, a trade that would have been infinitely more favorable if it had not been continually jeopardized by aggressions and threats of aggressions, Japan actually became poorer in every real sense of the term during each of the ten years prior to the attack on Pearl Harbor, because of her military expenditures and the cost of attaining an uneconomic self-sufficiency in industries essential to warfare.

Under a system of free economy and divested of the burden of a military establishment, Japan's overseas trade can bring her an actual prosperity, expressed in terms of an over-all increase in living standards, such as she has never known. However, the problems confronting any provisional government in reestablishing this trade will be considerable because the mark "Made in Japan" has become anathema in the countries with which most of this trade must be conducted. This can be obviated by marking Japanese goods with the name of the provisional government, clearly indicating that the industry is under Allied control.



## XII.

# Hydroelectric Development

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*Few Americans understand how little the great industrial development of Japan has affected the personal lives of the Japanese people. Whatever American industry produces is for home consumption; only the surplus seeks a foreign market. There are exceptions, of course, but that is the rule. Ninety per cent of the homes in the United States have one or many modern devices to save time, save labor, give pleasure, or give comfort.*

Ninety per cent of the homes in Japan has none of these. What Japanese industry produced was made to sell abroad, or, in effect, to trade abroad for material to expand that industry or to feed the country's war machine. The home market, with few exceptions, was industry's stepchild and was fed on its crumbs.

A highly placed Japanese worker, a bookkeeper in a modern office, or a foreman in a machine shop full of the latest equipment is back in the Middle Ages when he steps inside his own home. His wife or his servant cooks over a charcoal fire built in a box filled with clay. There is no plumbing in the house; even in the large cities the water tap is likely to be outside. Only one article in the house can be termed a "modern convenience"—a 10-watt electric bulb that hangs by a bare cord from the paper ceiling. Nearly every house in Japan, no matter how poor, has its electric light. Electricity is used almost as universally in the country as in the city. Only a few mountain hamlets and some of the smaller outlying islands are not served by power lines.

Electricity is of tremendous social and economic importance in Japan, if only because it is the first universal intrusion of the modern world into the atmosphere of medieval traditionalism in the Japanese home. Though the great majority of the houses have only a single, small, dim bulb, even the children know that the same mysterious force will operate all kinds of interesting and useful "gadgets." When the government cut down on the production of all consumer goods, a considerable number of alternating current radios

and a lesser number of sewing machines and refrigerators were already being used by the wealthy in the larger cities. The demand for such articles was enormous. The only reason it was not supplied was that the imperial government was more interested in producing guns.

Furthermore, small machines driven by electricity—bench lathes, grinders, saws, sewing machines, and the like—came into general use in those one-family sweatshops that make up the vast industrial slums in Osaka, Kyoto, Kobe, and, to a smaller extent, in other cities. These shops turn out a large share of Japan's total industrial production, particularly of subassemblies and pre-fabricated parts and materials that go into final assemblies in the larger plants. Thus even the very poor now have at least a knowledge of electrical devices and will constitute a vast market when such appliances become available at a low cost.

But the primary reason why electricity is of such great importance in Japan is the growing scarcity of fuel and the comparative abundance of actual and potential sources of water power.

According to the consensus of several surveys, Japan had a potential of 15 million kilowatts of hydroelectric power, at the average minimum flow, that could be immediately developed. Three million, eight hundred and eighty thousand were already developed in 1937, and the capacity of plants under construction was 890,000. The latest figure for the capacity of thermoelectric plants—generators turned by steam power—was 2,640,000 kilowatts in 1935. Most of this potential was in "stand-by" plants operated to take up the peak load at certain times of the day or to supply power during times of exceptional drought. Steam-generator plants produced a continually decreasing percentage of the nation's total power during the last pre-war years.

It will be seen from the figures above that Japan went into World War II with about one-third of her hydroelectric potential developed. It is doubtful if any additional plants were built during the war, partly because of the wartime lack of steel and construction skill, and partly because she was expending considerable energy and a great deal of her resources in attempting to complete huge hydroelectric projects in Korea and Manchuria.

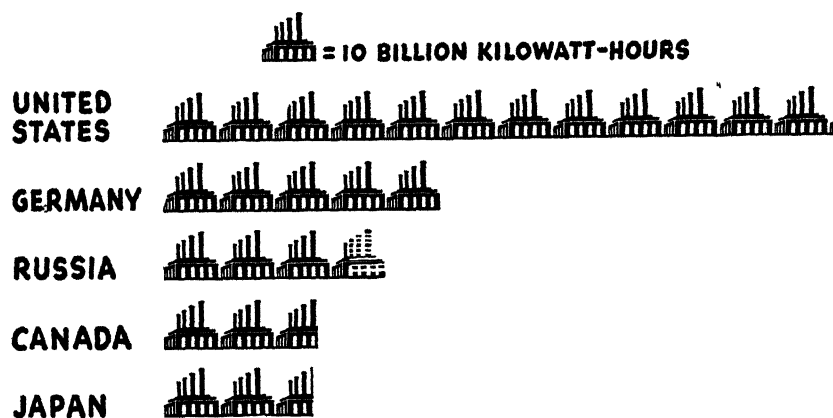
As was indicated earlier in this book, Japan has a mountainous terrain, and her comparatively heavy and fairly well-distributed precipitation makes for a high hydroelectric potential, with many

power sites scattered all over the country. But there are some drawbacks to large water-power development in a country of swift, short streams. Such streams are certain to have a comparatively restricted watershed and great seasonal fluctuation in flow even where the rainfall is well distributed throughout the year, and they are not likely to furnish dam sites with sufficient capacity to store more than a fraction of the seasonal runoff

For that reason an exceptionally dry year, such as 1939, necessitates the reduction of power output by a third or even a half, sometimes over a period of months, until the rains fill the dams again. Of course multiple dam construction on each stream would assure a two-year supply of water and, if carried out extensively, would give Japan many times the estimated 15-million kilowatts potential, but this has not yet been possible.

In spite of the universal use of electricity in Japan, the per capita consumption has been rather low—343 kilowatt-hours in 1936, as opposed to 868 in the United States, where great rural areas are

## **TOTAL PRODUCTION OF KILOWATT-HOURS COMPARED TO OTHER COUNTRIES**



still without electricity, or 1181 in Sweden, 2037 in Canada, and 2758 in Norway. In Japan the principal unit of consumption in the home is still a single 10-watt lamp. Many large industrial plants have been slow to convert from steam to electric power, partly because of the initial cost. Also, it must be remembered that until quite recently Japan produced a surplus of coal.

However, in total production in 1937, Japan was exceeded only by the United States, Germany, Russia, and Canada.

United States...	121 billion kilowatt-hours
Germany .. .	50 billion kilowatt-hours
Canada. . . . .	28 billion kilowatt-hours
Japan . . . . .	27 billion kilowatt-hours

Russia's consumption for that year has not been published, but it exceeded 32 billion in 1936.

Japan's first steam-driven electric generator for public service was set up in Tokyo in 1887. The first hydroelectric plant was built near Kyoto in 1891; it was operated by water from a new drainage project. Thereafter there was a free scramble by many firms and individuals to get into the business of generating and distributing electric current, usually in a small way.

These operations were well spread over the four main islands by 1910, and thereafter the inevitable process of consolidation and elimination began to accelerate. In 1935 there were still 818 companies producing for public consumption, and more than 8000 private plants, most of them for a single factory or institution.

However, the bulk of the business was in the hands of five big companies known in English as the Tokyo Electric Light Company, Toho Electric Power, Nippon Electric Power, Daido Electric Power, and the Ujigawa Electric Company. Their importance was due to the fact that they controlled the major plants and distributing circuits in and near the big cities, and also the principal source of hydroelectric power in the islands—the section of the mountainous territory in central Honshu that is directly north of Nagoya and from which an extensive transmission net extends to all six of the great Japanese cities. All of these companies and many of the smaller ones were very prosperous, regularly paying out dividends of around 10 per cent.

In 1936 the Diet passed a "regulating" law by which the government was to take over the operation of the principal generating plants, "reducing the private power companies to mere holding companies." Before the law went into effective operation it was superseded by another one, passed early in 1938, that created a single government-controlled company, the Japan Electric Power Generation and Transmission Company, to take over all plants and transmission lines in public service. Each "contributing" company was

given stock in the new monopoly equal to half the value of the total construction cost of its facilities, plus half of its "profit value." The government in turn guaranteed a 4 per cent dividend on the stock of the new company for ten years and saw to it that the bonded debts of the old companies were either liquidated or converted.

The formation of this new company was described as a war measure to increase the generation of power, facilitate nation-wide distribution, and lower power rates. However, it was in line with the pronounced trend toward nationalization of the means of production that became increasingly more evident during the past decade as the political power of the militant nationalists increased.

According to the last report, the policy-making authority over the national power company was the new Electricity Bureau, but actual operation of the plants and distributing systems appears to have been left largely in the hands of the administrative personnel of the old companies who have undoubtedly formed one of the typically Japanese top-faction "clan councils" to rule the industry.

The important centers of hydroelectric development are in west central Honshu and the northern district in Kyushu, because most of Japan's industries were already concentrated in or near those areas. Since a move to decentralize industry was under way before the war, it is certainly indicated that neglected power sites in other areas will be developed and that in the future industry will tend to move to the source of power. This decentralization has been widely advocated as a means of utilizing the surplus of labor in the rural districts, particularly the labor that is needed in agriculture for seasonal work. With the growth of local electrified industries, Japanese writers estimate that about five or six million workers can divide their time between the factories and the farms and thereby greatly increase the nation's output of consumer goods and approximately triple the income of the average rural family. This would mean the end of rural poverty and the solution of many of Japan's social and economic problems.

An immediate post-war expansion of the country's hydroelectric production is unquestionably indicated on other grounds. For example, the complete electrification of most if not all of the railways—already general in the Tokyo-Osaka area—is undoubtedly feasible. The government cannot go on subsidizing the production of coal in uneconomic mines. For the same reason the substitution of public hydroelectric power for the private steam-generated power still used

in many plants should be facilitated as soon as possible. And, as previously indicated, the increase in the domestic consumption of electricity brought about by better lighting and the general use of electrical appliances will greatly aid in transforming the Japanese people from medieval-minded serfs of modern machines into true moderns who participate in the benefits of the industries in which they are engaged.



The Marunouchi District, Tokyo. The administrative and transportation heart of Japan. Tokyo central station, housing the offices of the railway administration, is in the foreground. The large white building is the post office. The headquarters of most of the great financial and industrial concerns, as well as the imperial ministries and bureaus, are in this district. The grounds of the Emperor's palace are beyond the canal in the background. (Acme)



Stock Exchange, Tokyo, is thronged of clerks and workers for a very narrow circle of clients—the fifteen huge family corporations, their subsidiaries, and their wholly administrative employees. There is no large resting public in Japan as there is in America. (Acme.)

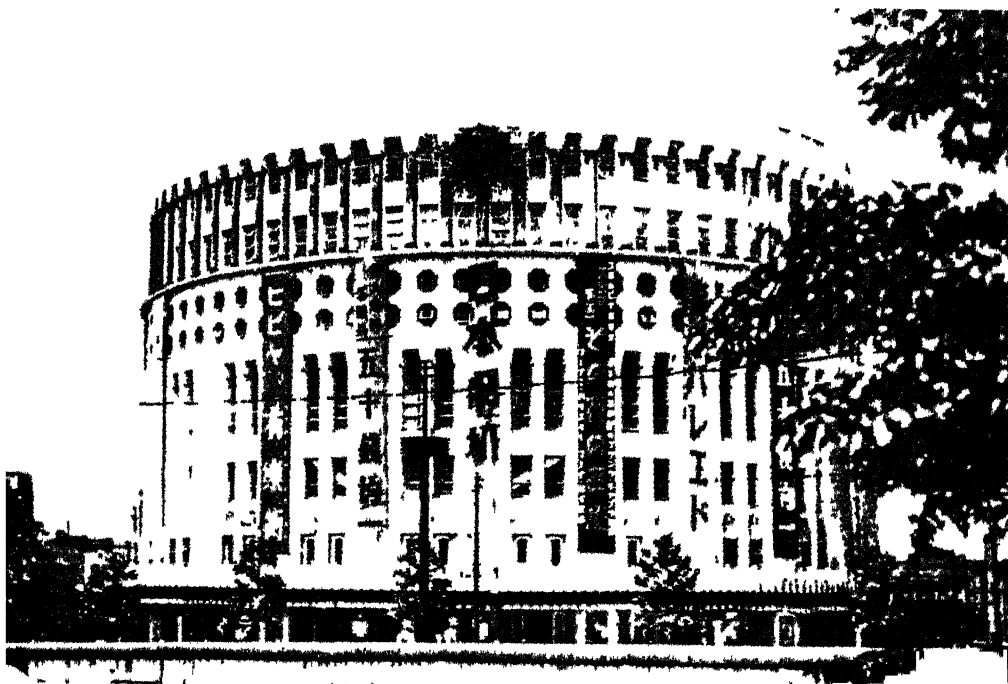




's city dwellers spend a  
share of their slender in-  
s on entertainment, in  
time Here's a phono-  
record shop The record  
contain music, or a story,  
talk on good manners,  
*e World* )



Typical First-run Movie Theaters, Tokyo (Japan Times, 1938.)





the Maruzen Bookstore on the Ginza, Tokyo's "Broadway." This was taken shortly before the war when translations of German books were popular. (iide World.)



Yokohama—the business district of the native quarter looking toward the harbor. The huge signs on the small buildings to the right announce a beer tavern and a notions store. Among the numerous bicycles on the street, two are hauling trailers, one loaded with freight. At the extreme left is a hand drawn delivery cart and, just below, parked by the left abutment of the bridge, is a rickshaw (*Wide World* )



The entrance to the Tokyo Yokohama huge canal in Yokohama's inner harbor  
(*International News*)

Kobe Harbor Thirty six per cent of Japan's overseas shipping cleared from this port  
before the war (*Ewing Galloway*)





Osaka—the industrial heart of Japan. This is the most congested and least modern of Japanese cities. Here are two of the very few wide streets. Note the wooden buildings and the wall-to-wall in unending rows, the tall chimneys in the background, and the industrial smoke hanging over the city. (Wide World )

## XIII.

# Manufacture

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*In order to give a clear understanding of the rapid development of manufacture in Japan it is necessary to refute the often-repeated misstatement that Japan was a thousand years behind the modern world when Commodore Perry forced his way into Yeddo Harbor at gun point in 1853. The Japanese did hold to certain social and religious ideologies that were many hundred years outmoded, but in the usual techniques of fabrication they were certainly almost as far advanced as the English had been seventy-five years earlier.*

The Japanese had excellent, well-developed, and long-established handicraft industries. They were undoubtedly the equals of any eighteenth-century European in weaving, though the English had lately invented superior looms. They excelled in ceramics, and had for centuries been producing cutlery superior to any made in Europe.

Even in 1870, when the use of mechanical power really began to be developed in Japan, the Japanese could not fairly be said to be more than half a century behind the western world in that field, for in 1820 its applications were very limited everywhere and the engines employed were exceedingly primitive.

Furthermore, the Japanese had many compensating advantages. They already had large urban centers and a numerous, well-trained, well-disciplined industrial proletariat. They had centuries of experience in adopting and adapting foreign techniques, and the Sat-Cho coalition that had just come into control of the government was committed to the thesis that Japan could fulfill her destiny only by becoming a great industrial power.

The development of manufacture in Japan followed this pattern:

1. *The production of silk fabrics, chinaware, and objects of art by handicraft methods* to be sold abroad. The proceeds were used to purchase articles of foreign manufacture for which a large demand had been created in Japan.

2. *The production of foreign-type consumer goods* in Japan, using imported machines and imported technical advisers. Both Japanese

and resident foreign merchants soon discovered that, because of the prevailing low costs, goods manufactured in Japan could be sold at a fraction of the price of imported commodities and thereby the purchasing power of the huge low-income masses could be tapped. Thus began the "not-so-good but twice-as-cheap" policy that has dominated Japanese mass-production industries and has been largely instrumental in their phenomenal growth.

The development of markets for cheap Japanese goods among low-income groups abroad, particularly in Asia, followed in natural consequence as surpluses developed. Later, as the government need for foreign currency grew, the well-secured home market was consistently neglected and emphasis was shifted entirely to production for foreign markets.

3. *The development of heavy industries.* The next step was the manufacture in Japan of the machines that made the consumer goods and the ships and vehicles that carried them to market. Japan began to import machine tools—the machines that make machines—in order to exploit to the utmost her capacity to produce the metals and minerals necessary to the production of heavy machinery, and to import great quantities of metals and minerals to supply the growing needs of her heavy industries.

There were two reasons for this development: (1) Japan soon realized that her human resources—labor and managerial skill—and her strategic commercial position were most important. To exploit these fully, the greatest possible percentage of her imports must be bulk raw materials and the greatest possible percentage of her exports must be fully processed goods. (2) The Japanese government was increasingly committed to a program of military expansion for which a high degree of industrial self-sufficiency was a necessity.

4. *The creation of a machine tool industry in Japan proper.* This, if fully realized, would have been the final step in achieving industrial self-sufficiency, except for the inevitable importation of raw materials, the source of which the Japanese sought to monopolize by military means. Machine tools—lathes, milling machines, planers, borers, grinders, and their complicated automatic offspring—not only create other machines of all types, but they alone of all mechanisms are self-creating.

In manufacturing cheap, rather low-grade consumer goods the Japanese became so proficient that they were practically without



competitors. Despite the fact that they had to import nearly all the raw materials and pay heavily for fuel and power, they would have swamped the world market with cheap goods, particularly textiles, but for the tariff and quota restrictions raised against them.

In the heavy industries the Japanese were on the whole much less proficient, as shown by the fact that they had to support these industries by both direct and indirect subsidies. They are the least proficient of modern industrial peoples in the manufacture of machine tools and in other processes involving precision standards and close tolerances.

Adhering to the principles of all-out war, Japan began to curtail her profitable light industries in 1937, tolerating only those whose export business brought in much-needed foreign exchange. Some plants were dismantled for scrap metal. On the other hand heavy industries were of necessity greatly expanded. This shift from exceedingly efficient and profitable light industry to inefficient and expensive heavy industry was an economic fallacy. But Japan was determined to make herself a great military power at any cost, and in these days of mechanized warfare this necessitates a great productive capacity in heavy industry.

A unique feature of Japanese manufacture is the survival of numerous small-family or household factories, many of which remained in production in spite of the development of large modern factories operating in the same field. In some lines—for example, some types of weaving, ornamental metalwork, paper making, and potteries—the household plants have maintained their traditional handicraft technique to this day. In others the small plants acquired small machines of the simpler types, usually electrically driven.

In several types of manufacture the household plants had the same advantages over the large factories that Japanese industry as a whole had over foreign industries. Their fixed cost was practically nil, for they were housed in the paper-and-plyboard homes of the operators. Safety regulations applying to the large plants were generally suspended in the case of factories that employed less than five—in some cases ten—paid hands, and labor laws were not enforced in the small plants. The operator in most cases employed only members of his family and certain collateral relatives, usually paupers whose status was similar to that of indentured servants in eighteenth-century America.

The strong sense of family or clan unity is an important factor in

even the largest plants. The management is obligated by law and custom to maintain a strongly paternalistic policy. In many large factories apprentices and women workers are housed on the premises. They are given not only their food and lodgings, but a technical, social, and cultural education (Japanese style only) as well. Wages are small, but in normal times and in the larger plants bonuses and benefits were quite important, approaching or even exceeding the actual wage paid. Discharge and layoff bonuses were always expected and were usually substantial.

Another factor must be noted. In normal times, when there was a labor surplus in the nation, a Japanese factory habitually employed from one-third to twice as many hands more as would be thought necessary in a similar factory with comparable equipment in the United States. The charge often heard from foreign technical advisers that the Japanese hire three men to do a boy's job is not entirely accurate, but there is some truth in it.

In 1936 the eight major categories of manufacture in Japan produced goods valued at about 13,000 million yen, or \$4,000,000,000 at the official exchange rates then current. There were some 3 million factory hands according to government figures, which covered only those plants with more than five paid employees.

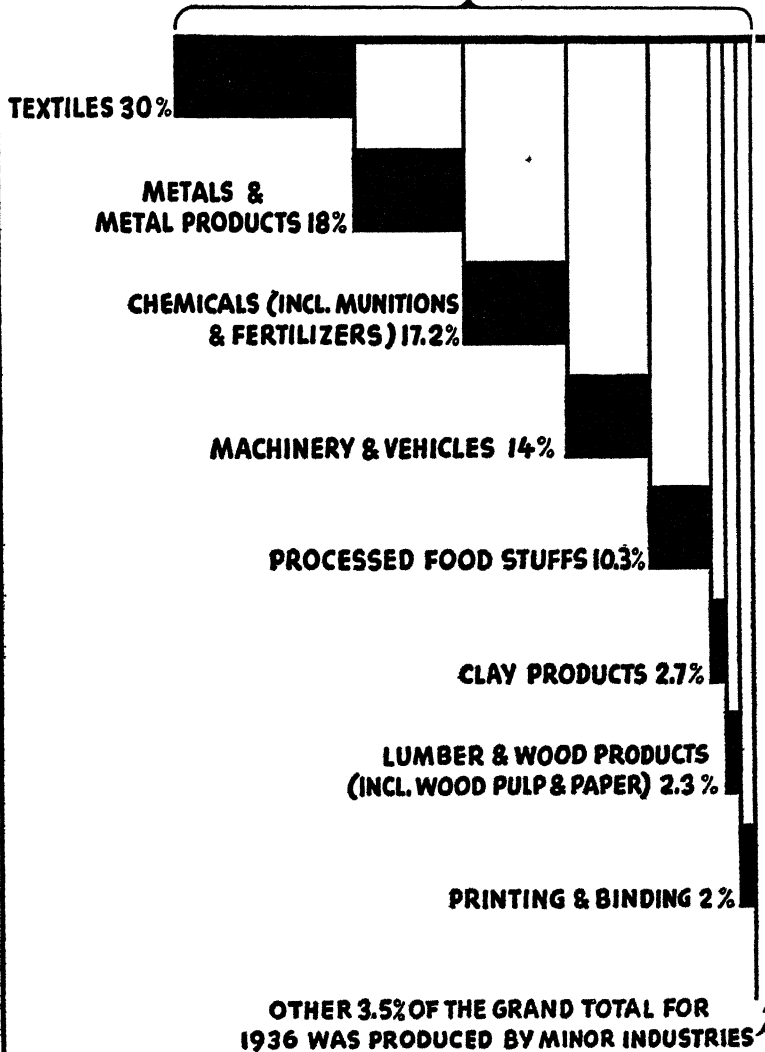
Twelve million horsepower was employed in production in those major categories, or 4 horsepower per employee. This ratio is much below that in the United States or Canada, but higher than that in Italy or Russia. The value added to the material used in the manufacturing process was only \$700 per worker employed. This is less than one-fourth the value added in the United States or Canada, and indicates that Japanese labor is, on the whole, not very efficient or is not efficiently implemented.

However, since nearly half of all production comes from plants employing less than five people (in some cases less than ten) no valid over-all horsepower-manpower ratio can be given, nor can labor costs be adequately calculated because data on these small plants are not available.

Nearly 30 per cent of the total output of Japanese factories (by value) was textiles. The figure given for 1936 was 3,654,888,000 yen. Metals and metal products were second in importance; these were valued at 2,208,866,000 yen, or 18 per cent of the total. This is four times the value of the 1932 output in this category, which then held fifth place, and shows that the shift to heavy industry began imme-

## **EIGHT MAJOR INDUSTRIES OF JAPAN**

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diately after the conquest of Manchuria. The production of chemicals, including both munitions and fertilizers, was a close third—2,110,915,000 yen, or 17.2 per cent. In fourth place were machinery and vehicles, valued at 1,716,000,000 yen, or 14 per cent—about three times the 1932 value. Processed food stuffs—1,259,000,000 yen, or 10.3 per cent—occupied fifth place. In sixth place were clay products, including dishes and other ceramics, valued at 329,000,000 yen, or 2.7 per cent—exactly the same relative value as in 1932. Seventh in order were lumber and wood products, including wood pulp and paper, valued at 280,000,000 yen, or 2.3 per cent. Printing and binding were eighth; their value was 234,000,000 yen, or about 2 per cent, this significantly indicates that the publishing industry is relatively of much greater importance in Japan than in the United States.

The total production of minor manufacturing industries was valued at 440,000,000 yen, or only about 3½ per cent of the grand total for 1936, the last full year for which complete data are obtainable. The average exchange value of the yen was about 29 cents during that year. However, in terms of wages and fixed expenditures paid by industry in Japan, a yen had a far greater domestic purchasing power than is indicated by the exchange value, which only shows its purchasing power on the world market.

For this reason it is impossible to determine the relative size and importance of Japan's production of manufactured goods in contrast to that of other countries by comparing their respective money valuations. For example, England's output in 1936 was valued at about \$13,000,000,000 in American money, as opposed to Japan's \$4,000,000,000, but it is not correct to assume that England's production was three times larger. It may not have been twice as large.

#### TEXTILES

During the years 1934-37 over one million Japanese worked in the textile industry. This includes only regularly paid employees, it excludes the hundreds of thousands of women and children in the families of thousands of operators of small spinning and weaving plants not covered in government reports. The statement made in several Japanese periodicals that three million people (including the dependents of those employed) were directly supported by the textile industry was probably correct. Millions more were indirectly affected by the industry, particularly those engaged in bringing into

the country the heavy tonnage of imported raw materials it demanded and carrying away the finished product for sale abroad. More than one-third of Japan's exports were textiles and fabrics.

This, the largest and most efficient of Japan's industries, must be spoken of in the past tense, for at this writing it is producing only uniform cloth and a minimum quantity of ersatz fabrics for civilian consumption. Part of its equipment has been scrapped—how much is not known. The scrapping of looms and spinning machines was probably due not entirely to the urgent wartime need for metals but in part to the fact that the dominant military group held to the German idea that the ruling nation should devote its energies to heavy industries and leave the production of cheaper consumer goods to its satellites. The textile industry was tolerated as long as its exports brought in badly needed foreign exchange, but when there was no access to foreign markets it was regarded as a business unworthy of conquerors; in the Japanese conception of a post-war world, textile mills would be operated in India and China with pauperized native labor and Japanese-made machinery under Japanese supervision. The fact that Japan has neither the resources necessary for the extensive development of heavy industries nor the tradition of their long and successful evolution, as Germany has, does not seem to have been important to the Japanese military; of course, no consideration at all was given to what might happen if Japan lost the war and was left with most of her textile mills either destroyed or dismantled.

The more mills that are found intact after the war, the less will be the task of post-war administration, for the rehabilitation of Japan's textile industry will be second in importance only to the rehabilitation of her agriculture. It will be made easier by the fact that the domestic need for textiles and fabrics will be enormous, for the major part of the Japanese population was literally in rags when the country entered World War II.

**Cotton.** In spite of the fact that Japan produced no cotton in commercial quantities and its production in the territory over which she gained control during her period of military expansion was both small and uncertain, the spinning and weaving of cotton goods was her most important manufacturing enterprise. Her technical advance in this field not only was greater than in any other manufacturing category, but, at least in weaving, it was probably greater than that of any other country. This was due, first, to the develop-

ment of great efficiency in the whole process of fabrication, and, second, to a Japanese invention, the Toyoda automatic loom. Forty of these machines can be operated by one girl after a few weeks of training, and with greater ease than she would need to operate six or eight power looms of the older type.

From 1933 to 1940 Japan was the world's largest exporter of cotton cloth. In all other important commodities she can truly be said to have exported the labor of her people, on the basis of value added to the raw material, usually purchased abroad, inasmuch as processing was the result of patient, painstaking toil. But in the case of cotton cloth the added value was largely the result of technological achievement and managerial skill. The total labor cost per square yard of gray goods averaged about  $\frac{1}{27}$  of one cent during this period. As the automatic loom was not yet in universal use, it may be assumed that the labor cost on the product of these looms was even lower than the above figure.

In fact, the direct labor cost in cotton cloth production has decreased everywhere until it has become a minor factor in the total cost. During the hearing in Congress on proposals to raise the tariff rates on Japanese cotton goods this cost was disclosed to be only  $\frac{1}{13}$  of a cent in this country on the commoner cotton fabrics. Hence the labor cost differential in favor of the Japanese goods was only approximately  $\frac{1}{26}$  of a cent per square yard. Yet the Japanese were able to import cotton from India and the United States, manufacture the goods, and ship it back to us at  $\frac{4}{5}$  of a cent per yard less than our factories could produce comparable material.

The low fixed cost, already described, is the reason—not only the low overhead of the mills themselves, but the low cost of shipbuilding and ship insurance—which made it possible to reduce the transportation cost to a minimum. ✓

Soon after the Japanese ports were opened to foreign commerce a demand for cheap cotton cloth developed among the growing industrial population. This was at first satisfied by imported goods, principally from England, but soon the domestic production of cotton fabrics developed, first by importing English cotton yarn to be woven on Japanese hand looms and then by importing British and American machinery for spinning and weaving. In its successful competition for the domestic market, Japanese cotton textile production gained great impetus. Most of the "Big Name" holding companies established subsidiaries for the production of cotton textiles,

and since they had or could procure capital, they imported both modern machinery and foreign technical advisers. But hand looms remained in operation in thousands of homes and production by primitive equipment continued despite technological advancement.

The technique of further processing cotton cloth—the bleaching, dyeing, and printing of the so-called “gray goods” which are the immediate product of weaving—was developed simultaneously, although a large part of Japan’s exports continued to be cheap, coarse cotton piece goods for the Asiatic, East Indian, and African markets.

In this connection spinning machinery was developed to handle the cheap, very short-staple Indian cotton for which there was small demand elsewhere. Most of this went into low-grade textiles, but the process for mixing it with expensive long-staple Egyptian cotton to make stronger, finer yarn was evolved. However, the major portion of the better-grade fabrics was made from medium-staple cotton imported in large amounts from the United States, and later from Brazil, where most of it was grown by Japanese colonists. Exports of cotton from China and Manchuria were negligible until after 1931.

Japanese cotton textiles did not become important competitors on the world market until after World War I. The country’s successful bid for control of this market came during the depression in the early 1930’s after the Japanese had developed a unique production complex built up on European machines—or Japanese copies and adaptations of them—plus a paternalistic and very Japanese system of training and controlling an ample supply of labor, and after the sudden and spectacular introduction of the Toyoda loom.

Neither the apprentice system nor the use of contract labor is new or exclusively Japanese. Both are as old as industry and are, or have been, universal. But in the Japanese textile industry they have had a unique development. This occurred simultaneously with increasing distress in the rural districts resulting from overpopulation and the increasing rise in taxes and debts. It was usual for a farmer with more children than he could feed to send one or more of them to a brother or cousin who operated a shop or a one-family factory in the city, “to work for their rice.” These children were unpaid, except for gifts; but if they were diligent and the city relative was moderately prosperous he was obligated by custom to see that the boys were established in their trade and the girls given suitable dowries. This practice is still widely current in the great industrial slums of Japan.

When modern textile mills were erected there arose a great demand for child labor, and children, usually girls, were recruited from the overabundant farm families under time contracts. These contracts called for the payment of a fixed fee to the girls' debt-ridden fathers, certain small amounts to the girls as spending money, in addition to their food, clothes, and lodging, and a bonus to each girl who finished her contracted time. This was to be her dowry.

There is no doubt that at first the girls who were literally sold to the big mills were worse off than their sisters who went into the sweatshops of city relatives. The living conditions of the latter were at least no worse than those of their employers' immediate families, for custom and public opinion gave them something approaching the status of daughters. In the big mills the management had no paternal obligations. In 1915 young girls under contract for three years worked from 4.30 A.M. to 7 P.M. and received no pay the first year; thereafter they were paid from \$1.50 to \$2.00 a month. Out of this, before they were released, they were obligated to repay the advance given their fathers. Since the interest was compound and the rate prohibitive, in most cases this meant slavery for life. Living conditions were frightful, and death from tuberculosis was the common fate of these girls. Contemporary Japanese maintained that "conditions are as bad as in the child-killing English factories of the last century!"

Both by government decree and by social pressure—which is probably more operative in Japan than in the United States, though in a different manner—the millowners were compelled to assume a greater degree of responsibility toward the girls. They were still the lowest paid of all Japanese workers—they received an average wage of around 20 cents a day in 1935, the boom year in the textile industry, or from one-half to one-sixth that paid free women in other industries—but their living conditions were vastly improved. The dormitories in the best mills were as good as or better than those in high-class Japanese private schools. The girls regularly attended classes in several subjects, ranging from home management to flower arrangement, that were designed to make them superior housewives and loyal and devoted subjects of the Emperor. This was in addition to the ugly but adequate uniforms and other clothes and the free medical attention they received.

While working conditions were by no means uniform in all the mills, the great majority of the 700,000 girls employed just prior to



the war—most of them in cotton mills—worked under conditions vastly superior to those in their own homes. As a rule, the girls were eager to work, and the mills came to be looked upon as social benefactors. On their part the mills obtained the services of the girls during the time when they were most active and most healthy—sixteen to nineteen. The ablest were retained as instructors, supervisors, and specialists after their contract time was served. Thus the labor supply was always ample and the turnover was regular and calculated.

The Toyoda loom that increased the output per worker about five times was developed in secret and little or nothing was known about it outside the country until 1934, when Japan's exports of cotton goods increased enormously and suddenly exceeded England's exports by 600 million square yards. The total production for that year exceeded 4500 million square yards and this rose to more than 5000 million square yards in 1935. Although the new automatic looms were largely responsible for this huge production, it is interesting to note that 80,000 old single-width power looms and nearly 50,000 hand looms were still in operation that year. There were many small mills—over 45,000—with less than ten looms each, and only a little more than 1000 with more than fifty. The latter included the mills that had the new automatic looms and therefore their output constituted a great part of the total.

Repercussion of Japan's sudden dominance in the world textile market was felt in the United States, but England was hardest hit, not only because her textile production was important but because Japanese goods found their largest sale in India and the British and Dutch colonies in the Far East, which had been England's best export market. Quota restrictions were immediately placed on Japanese print goods in India, and Japan retaliated by cutting down on her purchases of India's short-staple cotton, which had practically no other market.

Japan maintained her leadership in cotton textile exports during the succeeding years through an involved contest in which she used her own buying power, her controlled currency, and the low selling cost of her goods as weapons. In the meantime she had already established a virtual monopoly at home, for only a limited amount of highly specialized foreign fabrics could compete with the local product. The Ministry of Commerce and Industry reported that the home market for cotton goods "reached the saturation point" in

1933, because domestic consumption remained at the 1933 level for about two years. But with the increase in buying power incident to the rise in employment in war industries immediately before and after the attack on China, consumption of cotton goods rose again. This led to increased imports of raw cotton, which amounted to 10 million piculs<sup>1</sup> during the first half of 1937, or about 3 million bales for the six-month period.

Wishing to conserve foreign exchange for the purchase of war materials, the government passed the temporary trade control law, which limited cotton imports to 3,700,000 piculs for the last half of that year. As every effort was made to maintain and, where possible, increase the export of cotton textiles, domestic consumption had to be drastically curtailed.

In December, 1937, the Ministry of Commerce and Industry decreed that "staple fiber or other non-woolen or non-cotton fibers" had to be mixed with all cotton spun for domestic cloth. "Staple fiber" is short lengths of rayon filaments especially made for such mixtures. "Other fibers" are silk and various locally grown vegetable fibers of minor importance. The domestic sale of pure cotton clothes, if manufactured for export, was prohibited.

Export sales of cotton textiles and fabrics remained at about 60 per cent of their 1935 peak volume; the volume decreased slowly, but the decrease was more than made up by the increase in price. Domestic consumption was continually curtailed, first by requiring the addition of more and more staple fiber and then by the rationing of cloth. By February, 1940, the production of this mixed yarn for domestic consumption had declined 63 per cent, and by the end of the year it had ceased. Only silk and synthetic fibers—and those in limited quantities—were permitted to be used in fabrics for the home market.

By these restrictions Japan was able to maintain a favorable trade balance of 130 million yen in cotton products in 1939, which about equaled that in 1935 on a much greater volume of goods. However, in order to do this she had to make hasty sales of cotton yardage and "gray goods"—unbleached cotton cloth—in large amounts, necessitated in part by a growing shortage of bleaching chemicals. This was contrary to her fixed policy of selling fully processed goods and it marked the beginning of the disintegration of the cotton textile industry.

<sup>1</sup> One picul equals 133½ lbs.

Before the attack on Pearl Harbor, this industry had practically ceased to exist. Some cotton yardage was still being made for military uniforms, but with the foreign market no longer accessible most of the few spindles and looms in operation were using synthetic fiber or other cotton substitutes.

In 1942 word came from several sources in Japan that large quantities of spinning and weaving machinery were being scrapped for metals needed by the shipbuilding and munitions industries. It does not seem likely that any of the automatic looms will be scrapped despite the fanatical eagerness the Japanese have demonstrated for stripping themselves to further the war. A larger tonnage of steel is to be found in the obsolete types of weaving equipment that still constituted by far the greater number of machines in service.

If any sanity is left in the Tojo government, little or none of Japan's valuable spinning machinery will be scrapped. At the highest estimate Japan had only 10 or 12 million spindles, less than one-third of the number in England, and about one-third of those in the United States. In both of these countries a high percentage of idle spindles has been common for years, but not in Japan, where work has gone on night and day. She had only a few more spindles than India, yet she shipped thousands of bales of yarn to India, besides supplying the enormous demand of her own looms.

The same thing may be said of the automatic machines used to print millions of yards of cotton cloth with the gaudy patterns popular with purchasers in the Far East and Africa. These intricate and expensive machines were comparatively few in number and the steel they contain would hardly warrant their being scrapped.

Although it is impossible to predict what the Japanese military may have demanded in their last extremity before defeat, it seems probable that Japan will come out of the war with the most modern and efficient of her equipment intact, with most of the trained personnel of the textile industry surviving, and with its tradition fairly unimpaired and therefore capable of reconstructing its complex organization. Hence it is likely that the production of textiles will again become Japan's most important industry after the war if a system of free economy prevails—that is, one in which the flow of goods in world trade is no longer impeded by cartels, quotas, or excessive tariff barriers designed to insure uneconomic self-sufficiency in any particular area.

Japan's cotton mills are geared to produce the cheapest textiles

from the cheapest cotton. For millions in the Far East there is no alternative between Japanese goods and goods made in Europe or America—it is a choice between Japanese goods and nakedness. No English or American mills, with their present fixed costs, can turn out cloth these people can buy in any quantity. On the other hand the great bulk of the Japanese cloth is too inferior to make any serious inroads on western markets. Japanese competition has been and will be felt by some mills in the southern states that produce a great deal of coarse unbleached cloth for export, but even this cloth can compete with the Japanese product in certain fields. Reports from Africa state that the wealthier and more sophisticated natives prefer the more expensive American piece goods—sold in strips for loin cloth—because it lasts longer and has a resale value when it is a year old. The poor and the simple buy the cheapest possible Japanese cloth, which disintegrates within a few months.

The Japanese mills may face some serious post-war competition for their cheap markets from the mills in India and China. But this is contingent on greatly improved efficiency in India—her industry has had to have extensive aid from quotas and tariff in order to meet Japanese competition at home—and also upon the preservation of the Chinese mills now in Japanese hands and under Japanese management. These mills were able to produce cotton yarn and some types of cotton yardage cheaper than the mills in Japan and for a time caused unemployment and distress in the Japanese industry.

**Rayon and Staple Fiber.** Rayon is a synthetic made by forcing chemically processed wood pulp through small apertures to form long, continuous filaments that have some of the physical qualities of silk and can be spun, knitted, or woven like silk. Several processes for making this or similar materials have been in use in Europe and America for some sixty years; many have been discarded and the rest have been continually improved. It was not until immediately before the beginning of World War I that rayon production was sufficiently developed to compete seriously with silk in certain markets. It ceased in Italy and Germany in 1914, when the plants were converted into factories for making explosives, but continued in the United States. However, with our wartime prosperity in full swing huge sections of our population had money enough to buy real silk at boom prices and rayon remained a rather scorned poor man's substitute.

The Japanese were continually apprehensive lest an improvement

in the quality and marketability of rayon might ruin their all-important silk trade and as a precaution they themselves began to produce rayon in 1917.

The price of raw silk remained high during the period immediately after World War I and the rayon industry developed slowly. The Japanese were busy, as usual, mastering the technique and acquiring a backlog of tradition for both the making of rayon yarn and the weaving of rayon cloth.

In 1925 production of yarn rose to about 30 million pounds. Japanese rayon was still far inferior to silk, particularly in durability, and it was considerably inferior to the American and even the Italian product. But it was very cheap. The Japanese were able to turn out rayon yarn and some kinds of rayon cloth for half of what it cost in Italy and a third of what it cost in the United States. The reason, again, was the low fixed cost of Japanese operators.

As rayon was now a domestic product, it was patriotic for the Japanese to wear it, and a great demand was created among the poorer classes. By 1934 Japanese production of rayon yarn rose to 120 million pounds, an increase of 400 per cent in nine years. A large demand was developed in India and throughout Asia. Japan's exports, of both yarn and cloth, exceeded those of Italy, erstwhile leader in the field. The Japanese had learned to imitate in rayon a wide variety of silk fabrics, crepes, satins, and velvets. Millions in the Far East who regarded these fabrics as symbols of wealth and luxury found the rayon imitations within their limited means and became enthusiastic purchasers.

In 1937 Japan's output exceeded 324 million pounds and was larger than that of the United States. We had long been the world's leading producers of rayon, but our exports were comparatively small because of the thriving market at home for our relatively expensive and superior product.

Japan lost her leadership the next year, when production was curtailed to 198 million pounds, because of wartime mobilization of her industries, restrictions on domestic consumption, and the assignment of certain factories to the production of staple fiber to be used in ersatz mixtures with cotton and wool.

In considering the post-war future of this industry the following facts are important:

1. The twenty-one Japanese companies producing acetate filament by the viscose process (only one firm produced Bemberg-

type yarn under German license) had an asserted production potential of 600 million pounds annually, or more than the combined capacity of British and American mills. There is no indication that any great part of this capacity has been destroyed.

2. Japan can produce rayon goods at a price that averages less than half of that for British or American goods of similar kinds.

3. Japanese goods, admittedly inferior, are the best that millions of low-income Asiatics can afford.

4. The new synthetics (nylon, etc.) now being produced in America are much more expensive than rayon—more expensive even than raw silk—and hence will have no place in this market in the immediate future, though they well may eventually supplant rayon completely in the domestic market.

Therefore it is only reasonable to assume that under a system of free economy Japan will again become the world's leading producer and exporter of rayon. India may increase in importance as a weaver of rayon cloth but will continue to import Japanese yarn.

Staple fiber is rayon processed in short lengths, rather than continuous filaments, so that it can be mixed and spun with cotton or wool fiber. The Japanese government began an extensive advertising campaign as early as 1937 to sell the domestic consumer on the idea that these mixed fabrics were almost if not quite as good as the real thing. However, they continued to disintegrate in washing more rapidly as the percentage of staple fiber increased, and to the consumer were just another horror of war. Unless some unheard-of improvement has been developed there is no future for staple fiber.

Another wood-pulp fabric was made by twisting paper into yarn from which several types of fibers were woven. This was long used in the production of a cheap imitation of the well-known Panama hat; it looked good when new but the first rain made it a soggy, misshapen mess. Japanese periodicals published glowing accounts of the successful production of kimonos, suits, gloves, and handbags of woven paper fabric, and of knitted paper socks and underwear. Data on the high tensile strength and abrasion resistance of these fabrics were published, but none of them is convincing.

**Silk.** Despite the fact that Japan exported about 70 per cent of her immense production of raw silk in normal years and used a considerable fraction of what she kept in the manufacture of silk and rayon and of silk and wool mixtures, she still had enough left to produce

a large yardage of silk fabrics. Just how much is not known, probably not even to the Japanese government, because a great deal was turned out on hand looms for home consumption and hence did not enter the usual channels of trade. However, exports ran between 120 and 130 million square yards annually during the immediate pre-war years, bringing in foreign exchange equal to about 30 million United States dollars.

The Japanese still use every kind of reeling, spinning, and weaving equipment, from the most primitive to the most modern. They weave all the numerous silk fabrics that are commonly sold in Europe and America—pongee, crepe, satin, damask, etc.—and several that are unknown outside of Japan. While most silk cloth for export is, or was, woven on modern power looms, more hand looms weave silk than any other type of fabrics. The Japanese say that the cheapest and the most expensive silk fabrics, neither of which is exported, are still woven by hand looms. Other high-quality silk is woven on rather simple power-driven looms and the yardage produced per labor unit is necessarily low.

Some knitted silk fabrics—stockings and underwear for the most part—were produced in Japan but have not been large competitors on the world market. The Japanese have never been able to knit silk stockings that have a satisfactory fit even with the same machines as are used in the United States. So far the Japanese operators have been unable to achieve the high degree of technical skill required to shape a stocking properly. Their failure to make well-fitting silk underwear seems to be due to the fact that they are not competent in cutting knitted goods on the bias.

No doubt the production of silk fabrics has suffered from the fact that the export of raw silk has been so important a factor in Japan's national strategy. Until 1937 all the efforts of the research experts working for the government and the various sericulture associations were directed toward producing a type of silk suitable for export, particularly to the silk stocking manufacturers in the United States. This was not necessarily the best and certainly not the most economical kind for weaving, particularly for domestic looms. Thus domestic fabrication became more or less the stepchild of the sericulture industry.

After 1937, and particularly after 1939, efforts to produce types of silk filament that would be cheaper and especially suitable for mixed fabrics were increased and experiments were conducted in proces-

sing silk so that it would counterfeit wool, linen, and even cotton. Owing to the high labor cost of producing any kind of raw silk, much of this effort will have no practical application after the war, but a great deal of skill and ingenuity was displayed and some results important to future silk textile production may have been achieved.

No doubt the domestic consumption of silk rose during the war because of the shortage of other textiles, and it will probably continue to grow under a system of free economy in which the individual's purchasing power is increased by the removal of much of the burden of taxation. Whether Japan's export market for silk fabrics will increase or decrease depends on several extraneous factors—post-war purchasing power in Europe, the extent of damage to the silk weaving industry in France and Italy, and, to a lesser degree, the development of commercial silk weaving in China.

**Woolens.** The development of the woolen industry in Japan was somewhat slower than that of cotton fabrication but followed a parallel course. First, there was a domestic demand. The industry grew until it crowded imported goods out of the domestic market. Then, in spite of the fact that all of its raw material had to be imported, it continued to expand by capturing an increasing percentage of the world market. Export goods were continually improved, whereas the domestic market, which was secure from competition, was supplied with inferior mixed fabrics. Finally, both export markets and the imports of raw material were cut off and the industry collapsed shortly before Japan attacked the United States. Some cloth continued to be woven from mixed fibers, most of it to meet military demands.

In the case of woolens, the earliest domestic demand was for cloth for uniforms, then for European-type garments, and finally for a certain kind of serge that became popular for kimonos around the turn of the century. The so-called "foreign-type" serges, worsted and woolen—copies of European weaves and patterns—varied a great deal in quality at first, but most of them were poor. Methods were improved and testing laboratories were established both by the government and by producers' associations; and in 1931 the local authorities at Nagoya, the principal manufacturing center for higher-grade woolen fabrics, set up rather rigid standards of quality for export cloth.

Production of woolen yarn and cloth boomed during 1932 and



1933 and exports increased. The Japanese, as usual, could undersell all competitors on a depression market where price was a greater consideration than quality. No figures are available on the actual number of pounds of woollen yarn or the number of square yards of woollen cloth produced, even at this early stage, because they might have given an indication of Japan's military strength and preparedness, since a large part of all wool products went into military uniforms. The total values of woollen goods produced are available, however. They are as follows:

Production			Exports		
201 million yen.	.....	1933	18 million yen	.....	1933
264 million yen .	. .	1934	42 million yen .	....	1934
296 million yen...	...	1935	42 million yen	. .	1935
339 million yen..	.	1936	61 million yen...	.	1936

At this time about 90 per cent of the wool used in the Japanese industry came from Australia, the rest from China and elsewhere; Japan's domestic production was practically nil. She had been buying Australian wool, at least in great part, by exporting large quantities of rayon and other non-woolen fabrics to that country. When Australia placed severe restrictions on these imports in 1936, the Japanese government ordered purchases of Australian wool reduced by two-thirds. However, Japan failed to find sufficient high-grade wool in South Africa, South America, or anywhere else, furthermore, she found that it was impossible to buy enough of China's coarse inferior wool to meet her military demands. She was therefore forced to make a deal for an additional 300,000 bales at Australia's own terms, for the attack on China had apparently already been planned and the Japanese army was insisting on a vast increase in the production of woollen uniforms.

The fact that Japan suffered both humiliation and the loss of foreign currency which she badly needed for the purchase of metals and munitions, was keenly felt by the army and added to the resentment against Australia engendered by her Asiatic exclusion policy. This probably had a great deal to do with the Japanese army's determined attacks against Australian territory in New Guinea in the face of preposterous losses.

Another development was the immediate decision to curtail, and finally to eliminate, the production of woollen goods for the home market. Imports of raw wool jumped from 217 million pounds in

1936 to 494 million in 1937, but this was largely due to delayed arrivals of wool contracted for in 1936. The greater part of this wool was reserved for military use, but exports were increased to 70 million yen. In 1938, under the Export and Import Articles, raw wool imports were limited to 150,000 bales for export textiles and 200,000 for military use, a total of more than a quarter of a billion pounds. Only mixed fabrics were produced for domestic consumption and by the end of that year many looms were sealed by government authority to prevent further operation.

How much of Japan's production potential has been destroyed by the scrapping of looms and other machinery is not known, but it must be considerable. The military expressed disappointment with the woolen industry several times after 1937 because it did not furnish enough cloth for export to pay its way, in spite of the huge demands upon it for uniform material. According to an article in the *Tokyo Asahi* in 1939, "Many woolen mills are marked for liquidation."

It should be noted that Japan has never been able to produce high-grade woolen fabrics that could compete with those of Europe and America, even on the home market. In spite of restrictions, the imports of quality suiting increased steadily in the late pre-war years with the rise in the income of the moneyed classes, until these imports were prohibited by the emergency enactments of 1938. But no foreign goods can compete with cheap or medium-priced Japanese woolens at home or with their cheapest woolen in the Asiatic and East Indies markets.

**Other Textiles.** The Japanese produced considerable cloth and other textile products from several other vegetable fibers.

Some flax has been grown and some linen produced, but the industry never attained commercial importance. Ramie (China grass) cloth, a fabric somewhat similar to linen and best known in the United States as Palm Beach cloth, is produced and exported in considerable quantities in normal times. The Japanese, copying a technique long practiced in China, used it in making drawn-work embroidery in tablecloths and the like.

There was considerable production of jute (gunny-sack material) and India hemp fabrics for sacking and other uses. Some sisal (henequen fiber) was imported for use in cordage.

By far the most important coarse fiber in Japanese commerce is Manila hemp, which is not a true hemp but the fiber of a

banana plant grown in the Philippines. Large quantities of this fiber were imported during the war to be used in making rope, cordage, and fish nets. Because of the overwhelming importance of fishing to Japan, as described in an earlier chapter, the manufacture of a wide variety of fish nets and of the twine and cord from which they are produced is an important industry. Although some nets are still made by the fishermen themselves and net repairing is an unending job that requires great quantities of twine and cord, most nets are now factory-made. Improved methods and quantity production have reduced the price. Just before the war this industry began to turn out an export surplus and was vigorously developing a market for it.

The standard floor covering in Japan is woven matting made from grass or straw, or, more rarely, one of several round and durable textiles. Floor mats are almost invariably 6 feet by 3, and one mat is the standard unit of measure for floor area. Thus the size of a house for sale or rent will frequently be described as 24 mats, 32 mats, etc.

The better grades of floor mats are relatively expensive, and as the quality of the floor covering is a matter of pride, their cost represents a large fraction of the householder's total expenditure for furnishings. The useful life of these mats is rather short, despite the universal practice of removing shoes at the front door. Hence mat-making is a huge industry that employs a large but unspecified number of workers. The data are incomplete because most of the mats were still the product of home handicraft, though mechanization was increasing. Probably around 1,250,000 people are regularly employed in this industry, and about a third of them are independent enterprisers.

In 1939 Japanese periodicals mentioned a serious floor-mat shortage because of the fact that the mat-makers had gone to work in war industries. Therefore this industry should furnish extensive employment for a considerable interval after the war.

#### METALS AND METAL PRODUCTS

The development of Japan's heavy industries in general and of metal production in particular has been principally due to the national urge for industrial self-sufficiency in the production of arms and munitions and in those machines that make such production possible. That these industries are largely uneconomic is proved by the fact that most of them, particularly the producers of raw stock,

have been continuously supported by direct and indirect subsidies. These have usually taken the form of tariffs on imported metals and their products, of government financing at low cost, and of preferential purchases by the army, the navy, the government-owned railways, and the large private enterprises that followed the government's economic policy. The result has been an artificially stimulated production, an equally artificial profit to the producer, and a *de facto* loss that was borne by Japan's taxpayers and consumers.

Once these artificial props are removed, much of Japan's metal-trades industry will collapse, because without subsidies most of its products cannot compete on the local market with imports from the United States or Europe, and the people of Japan will be relieved of the grievous burden of supporting it.

Production in metals and metal products has expanded tremendously since the last figures were released (2,208,866,000 yen in 1936). However, as this increase was due wholly to the war and was entirely uneconomic it may be disregarded in the present study.

On an average, half a million Japanese were regularly employed in all types of metal production during the years 1932 to 1937. It is doubtful if more than half this number will be thus engaged after the war.

**Iron and Steel.** The Iron and Steel Industry Law of 1937 prohibited plant expansion in Japan other than the establishment of blast furnaces for the reduction of iron ore. Its object was to prevent the expenditure of steel reserves in the construction of plants. Production of steel for military and naval purposes was increased by first limiting and then (in 1938) prohibiting production for all other purposes. Hence the highest production of pig iron for any month of which we have record—291,000 metric tons for May, 1937—was undoubtedly greatly increased, but the production of 447,000 metric tons of steel ingots in March, 1937, the peak figure recorded, was probably not greatly exceeded during the war. Even though some steel plant expansion may have been permitted later, production could not be increased over any considerable period of time because Japan's stock pile of imported steel scrap, most of it stored under water in Yokohama Harbor and at several other ports, has been depleted much more rapidly than pig iron production could be increased.

Thus while the ratios changed, the production of iron and steel probably remained fairly constant throughout the war, fluctuating

between 7 and 8 million tons a year. About one-third of this was produced in Manchuria and Korea.

There are three principal centers of production in Japan proper: (1) Yawata, near Moji, site of the great government-controlled Imperial Steel Works, greatest single source of steel in the nation; (2) the Kobe-Amagasaki-Osaka area; and (3) the Yokohama-Kawasaki-Tokyo industrial strip. There is some minor production throughout Japan, some of it with facilities that are unbelievably primitive.

All the larger plants, particularly the one at Yawata, are conspicuous and hence vulnerable to aerial attack, but it is likely that enough production capacity will survive substantially intact to supply Japan's immediate peacetime requirements, which will be comparatively small.

By and large, Japan is about twenty years behind the United States in the production of the numerous steel alloys that have become increasingly important in modern industry. Great and increasing efforts were made after 1930 to develop the production of these alloys and the program was heavily subsidized, but while the Japanese were learning to make the types produced in Europe and America twenty-five or thirty years ago, the technological advance in these two areas went on at an accelerating rate. Manganese is the only alloy metal produced in quantity in Japan, though there is considerable chromium and some tungsten.

Japan claimed one major advance in steel production. In 1935 a Japanese student evolved a method of producing low-carbon steel directly from low-grade iron ore, iron powder, and iron sand by the use of high-frequency current. The Nippon High Frequency Waves Heavy Industries, Ltd. (the N.K.J.K.K.) was established with a capital of 50 million yen; it had five plants in operation by 1939 and paid its stockholders 12 per cent dividends that year. It acquired five iron, five tungsten, three chromium, two nickel, two manganese, one vanadium, and one anthracite coal mine. Most of its plants are not in Japan but in Korea and in the Chinese province of Jehol, though some of them are in Kyushu and Hokkaido.

Japanese periodicals claimed that this process required only one-third of the furnace equipment and one-tenth of the coal used in conventional methods of producing mild steel. The amount of electric current necessary was not indicated. Ninety-nine per cent of the iron in the ore treated was said to be recovered. The claim was

also made that alloys made from ore thus processed are in every way superior to those ordinarily obtained, and that bits made from an alloy of this high-frequency steel have three times the cutting efficiency of those made from the best cobalt-tungsten steel.

These claims cannot be discounted without direct evidence to the contrary, although many Japanese claims have proved to be greatly exaggerated. Suffice it to say that the Japanese can make good steel, but at great cost. The steel they produce at a competitive cost has so far proved to be uneven in quality and therefore structural failures in vehicles and other articles made from it have been prevalent.

Japan's imports of iron and steel scrap in the period preceding the war averaged about 2 million tons annually but rose to 3 million in 1940. Her annual imports of iron ore likewise averaged about 2 million tons, pig iron one million, and iron and steel stock (ingots, bars, plates, etc.) about half a million. The accumulation of military stock piles was the prime reason for these imports. However, it must be remembered that the cost of importing many types of metal products has always been less than the cost of producing them in Japan, even if the subsidies paid to the producers are discounted.

Hence, it is likely that Japan will continue to be a rather heavy importer of ferrous products. The removal of the subsidies may cut domestic production down to the 2½ million tons that was the 1926-30 average. Primary production, that is, the production of iron pigs and steel ingots, may cease entirely.

**Other Metal Products.** Beyond the facts given in the discussion on mining in Chapter V, Japan's situation as to output of non-ferrous metal products is hopelessly complicated by the fact that a large but unspecified percentage has gone to the army and navy ever since domestic production began. Therefore it is impossible at this time even to estimate what the non-military demand for any of these products was, or what the normal peacetime demand will be. Certainly the present production facilities, barring wartime destruction, will be more than adequate to meet all the needs that may develop in the near future.

The largest demand will be for articles made of copper and its alloys; this will follow the wide and undoubtedly increasing use of electric power and electrical devices. The Japanese have ample facilities for drawing copper wire and making all types of copper and brass tubing, sheets, plates, and the like, as well as bronze bushings

and bearings. Large and well-equipped plants were operating in the Osaka and Tokyo areas, and in Ibaraki prefecture just north of Tokyo. Before the expropriation act of January, 1943, they were owned or controlled by several of the great holding companies. From all indications, they were efficiently operated and could continue to operate in a system of free economy, barring the destruction of their equipment and personnel.

The same thing may be said for the plants that turn out objects made of zinc and lead and their alloys. These plants' best non-military customers were the manufacturers of machines and vehicles (for bearings) and the huge printing and publishing trade which had to keep great stocks of type on hand because of the multiplicity of Chinese ideographs in constant use.

An extensive aluminum industry has developed in Japan since the war began. Whether it can be economically converted into peacetime production cannot be foretold. It is likewise impossible to forecast to what extent the production of objects of art from precious and base metals may be revived in the immediate post-war years, because many extraneous factors are involved.

### SHIPBUILDING

Shipbuilding is discussed in the chapter on transportation, pages 92-95.

### MACHINERY AND VEHICLES

Machinery and vehicles ranked third in 1936, with an output valued at a total of 1,716,000,000 yen. It may well have taken first place during the war, owing to the stepped-up production of engines, vehicles, motors, airplanes, and other military machines. In general, Japan had attained a large degree of self-sufficiency in the production of nearly all types of heavy mechanisms.

**Industrial Machinery.** The production of modern industrial machinery in Japan began in 1885 when the first machine tools were imported. Industrial machines themselves had already been imported in considerable numbers for about fifteen years previous. It may be assumed that the new lathes were first used to make parts for various machines that had broken down in service, since industry and transportation suffered serious delays as long as replacement parts had to be shipped from England and Germany. Never-

theless, the machine tools that came into the hands of Japanese operators were soon busy duplicating imported industrial machinery, sometimes under license from the patentee, sometimes not. Then and since, the Japanese paid license fees to foreign patent holders only when they have found it expedient to do so.

The history of the manufacture of industrial machinery in Japan follows the familiar pattern. First there was part-by-part copying of a foreign mechanism as exactly as the machinist's skill and the accuracy of his lathes, milling machines, etc., would allow. Usually both were far from perfect, and additional deficiencies developed when native steel was used. At first the copies were so poor that they would not function at all, but persistent attempts made them better and better. The machines thus produced were as a rule not quite as good but were twice as cheap as the foreign-built model.

The next step was the modification of the design by incorporating in a single mechanism parts of several foreign machines of similar make. This expedient was said to have first been undertaken to dodge patent regulations, but some of these assemblies soon proved to be better than exact copies of one model. This led to the modification of various parts to fit the new design. Later the Japanese learned to modify parts to meet local constructional or operational requirements. Frequently changes were made to avoid precision machine work, for which the Japanese have little aptitude, or to achieve greater simplicity.

The Japanese have shown great ingenuity in making these modifications. While they seldom if ever result in creating a mechanism better by absolute standards than the best comparable machines made abroad, they do produce the best one for the immediate purpose that can reasonably be expected in view of the available equipment and personnel.<sup>2</sup> Only in one case—the Toyoda automatic loom—have the Japanese been able to produce a machine that is generally credited with definitely superior performance to that of any made abroad for the same operation.

That Japan had not achieved self-sufficiency in the production of many kinds of industrial machinery prior to the war is indicated by the fact that her imports were valued at 30 million United States dollars in 1935, 26 million in 1936, and 76 million in 1937, the first year of the Chinese war. Machine tools are included in these figures, but not electromotive equipment. However, heavy imports of ma-

<sup>2</sup> See the discussion of the Mitsubishi S-00 fighter plane on pages 190-192.



chine tools did not appear until the second half of 1937; hence the earlier figures represent, for the most part, machinery for the production of consumer commodities. Japan exported 8 million dollars' worth of machinery in 1935, 10 million in 1936, and 16 million in 1937. To the latter must be added 7 million in textile machinery that was journalized separately. Mining and smelting equipment as well as general industrial machines was included. The principal destinations of these exports were Manchuria and North China, the "yen-bloc" areas. Some machines were reexported.

The *Japan Times Yearbook* for 1938 reports, "Textile machinery, chemical apparatus, elevators, cranes, winding machines, air compressors, mining machinery, printing and binding machinery, and scientific precision instruments are now manufactured in Japan in quantity more than enough to meet domestic requirements." The production referred to was for 1935 and 1936, and the indication is that Japan achieved self-sufficiency in producing these items during or before 1935. The same article says, in effect, that Japan would be able to supply all her needs in industrial machinery, "except for a few special types," but for the burden imposed on all heavy industries by military demands.

It is impossible to estimate to what degree the production of Japanese industrial machinery, other than textile equipment, has been bolstered by subsidies, national pride, and military necessity. There is no doubt that the Japanese can make some of these mechanisms much more cheaply than they can be imported. This is not true of others, despite low fixed costs and cheap labor. Too much time and material are wasted in constructing exceedingly intricate precision machines. Whether they function as well or stand up as long under continuous operation as comparable American machines do is debatable. Foreign comment on Japanese equipment seen in service runs all the way from "very good" to "awful."

Probably these comments are justified, for apparently the one certainty about all types of Japanese mechanisms is their uncertainty. There is wide variation in durability not only between various kinds of machines and various types and models of the same kind, but between individual machines of exactly the same type and model, even those produced in one factory at one time. This is due in part to the fact that the Japanese have not yet achieved anything like uniformity in workmanship, and to a lack of uniformity in material, especially steel.

Textile machinery stands as a case apart, because in the Toyoda loom, and probably in some kinds of automatic spinning machinery developed by Toyoda and others, an absolute functional superiority has been achieved. The amount of mechanical maintenance and replacement necessary to keep a group of these automatic looms in operation is not known, but there is no indication that it is excessive. In any case it is unimportant because their output per operator is so much higher than with other types of looms.

This loom was invented by Sakichi Toyoda in Nagoya about 1919. It remained in an experimental stage for about ten years and finally went into quantity production around 1931. Apparently nothing has been published on its development in England or America, and Japanese accounts say nothing pertinent except to state that it is "fully automatic" and "more fully automatic than any looms made abroad." English manufacturers made efforts to obtain licenses for its manufacture about 1934, but so far as is known, none has been produced there. One American manufacturer claims to have a loom that is equal or superior to the Toyoda machine, but this cannot be proved until we have access to the Japanese cotton mills.

**Engines and Motors.** By the beginning of World War II Japan was completely independent of the rest of the world for engines and motors of all sizes and nearly every type. Considerable numbers of automobiles and trucks, together with extra motors and spare parts, were imported as long as such imports were possible, to be added to the military motor pool. By 1937 construction capacity had passed any normal civilian demand for all types of steam engines and probably all types of internal-combustion motors.

**Prime Movers.** Steam engines, steam turbines, Diesel engines, and to a limited extent gas engines are used as prime movers in Japanese industry. In some places water wheels, some of them of new types, are used as the immediate source of power, in contrast to the much more common practice of converting water power into electric energy.

The Japanese navy's long and extensive study of all types of boilers and steam engines contributed greatly to the development of their manufacture. Several companies, including the great Mitsui Bussan Kaisha, acquired licenses to manufacture a number of well-known types of English and Scottish boilers, and from these they later evolved models of their own, all involving features adapted from the original.

The general opinion of foreigners who have knowledge of Japanese boilers seems to be that, although they are not good, the Japanese consider them adequate and they are certainly less expensive than imported boilers. The same opinion applies to large stationary steam engines. However, with the great decrease in economically feasible coal supplies in Japan proper and the continuing development of hydroelectric power, the manufacture of steam-driven prime movers is likely to be unimportant in the future.

**Marine Engines.** Japan has been able to supply almost all the marine engines of every type used by her rapidly developing navy and merchant marine during the past ten or fifteen years. These engines are not considered excellent but they are at least adequate. They are said to break down more frequently than the best English and American engines of similar types. They are overhauled less frequently than is the standard practice in the Occident, and they require a much longer and more extensive overhauling when they are laid up.

The recent trend toward motor ships powered with Diesel engines of one type or another has been conspicuous.

**Diesel Engines.** The Japanese navy began its experiments with Diesel engines before the First World War. The first commercial motor ship was placed in operation in 1923. The Kawasaki Company (at Kobe) had been licensed by the Maschinen-fabrik Augsburg-Nurnberg, the German concern that held the original Diesel patents, to make Diesel motors for naval vessels. Later the Mitsubishi company was licensed to make the same motors for commercial ships only. Other Japanese plants acquired licenses from English, Swiss, and Swedish firms to build several types of two- and four-cycle internal-combustion engines of the Diesel and so-called semi-Diesel types. In 1926 the Nippon Yusen Kaisha built a 16,000-horsepower Diesel prime mover. Many large stationary Diesels have been made since.

Regardless of whether Japanese-made engines of this type are as durable and efficient as those made in Europe, they are undoubtedly adequate and their manufacture is now a well-established industry that can more than supply the local market after the war.

**Electric Motors and Generators.** In 1940 the Tokyo Shibaura Engineering Works completed the world's largest generator to be installed at the Yalu River hydroelectric project in Korea. This was one of a succession of large generators, constructed by a dozen dif-

ferent Japanese factories, most of them in the Tokyo or Osaka areas, that have gone into operation in Japan, Manchuria, and Korea. All of Japan's newer generating plants operate with domestic equipment.

Japan's production of heavy electric motors is equally impressive. All the electric locomotives on her railways are Japanese-made, and so are most of the motors used in industry. The value of electric machinery produced in 1936 was 253 million dollars (as opposed to 531 million for machinery of all other types). Imports amounted to only 1.7 millions and were mostly small or highly specialized devices.

The effectiveness, durability, and comparative cost of Japanese-built heavy electrical machines are impossible to determine because reports from various sources are conflicting.

As to electrical consumer goods, the Japanese manufactured large quantities of cheap fixtures and devices, from light bulbs to electric fans, that found a wide market all over the world. They made a remarkably good appearance for the price but were not durable, they could seldom be sold a second time to customers who could afford a better article. The cheap light bulbs that once flooded our market were of exceedingly poor quality and consumed a huge amount of electric current for each light unit emitted. The Japanese have never been able to produce more complicated electrical devices, particularly those involving considerable precision in manufacture, at a cost that would allow serious competition with similar foreign products.

**Machine Tool Production.** Machine tools can be roughly defined as the machines that make other machines—the only mechanisms that are self-perpetuating. For this reason they are of the utmost importance to an industrial nation.

The basic machine tools are lathes, drill presses, milling machines, planers, shapers, grinders, and boring machines. Given these tools in the proper sizes, a good machinist can make any moving part for any mechanism, especially complicated parts that require several different operations involving the use of several machines or the skillful readjustment of one machine. Hence these basic machines are versatile, but they require experience and skill for efficient operation; moreover, the necessary changes and adjustments for each operation require a great deal of time and consequently involve too high a labor cost for large-scale production.

In the United States and somewhat later in Germany, various complicated adaptations and combinations of machine tools, such as automatic turret lathes, multiple boring machines, and many still more complicated special tools were evolved, either to perform one simple operation or series of operations very rapidly and without adjustment, or to complete simultaneously many different operations on one large and complicated piece of work. These machines are usually large, heavy, expensive, and complicated. Although they turn out a specified piece of work very rapidly and very accurately and consequently reduce mass-production costs to a minimum, they cannot be adapted to another even very similar job without extensive alterations or complete rebuilding. For this reason the retooling of a motor factory, for example, to build a new type of motor is a difficult and expensive task.

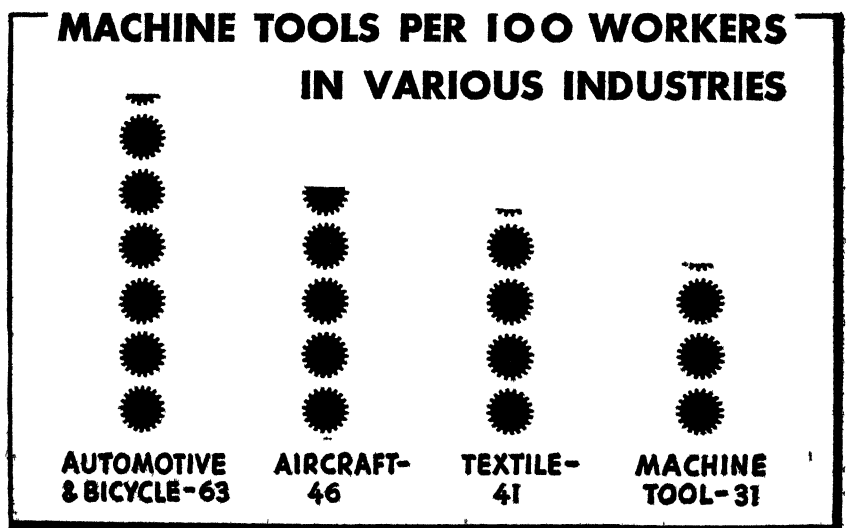
The machine tools imported by Japan in 1885 were basic tools. Ten years later—significantly, it was during the war with China, Japan's first foreign war in modern times—a primitive machine tool industry was set up in Tokyo to make copies of imported lathes for use in navy and army arsenals. Since then every war that Japan has contemplated or prosecuted has brought renewed activity and development in her machine tool industry. It has always declined radically during periods of peace because Japanese machine tools could not compete with those of foreign manufacture. One hundred companies were manufacturing machine tools during the First World War, but only a half-dozen remained in business after 1920. In 1928 there were ten companies in the entire country making machine tools, but only the Karatsu Engineering Works, the Okuma Iron Works, the Ikegai Engineering Works, and the machine shops of the Tokyo Gas and Electric Company had any sizable production. These plants were kept in operation by orders from the navy and army and the Department of Railroads, in accordance with the government's constant policy of maintaining domestic machine tool production.

This activity began to expand in 1930, but the United States and Germany continued to furnish nearly all of Japan's machine tools until 1932, when a boom in domestic production precipitated by the conquest of Manchuria began to make itself evident. By 1939 there were 460 shops in production; only twenty employed more than 200 men. That year a program was inaugurated to increase output 250 per cent. The only known result was the statement in Japanese

periodicals in 1941 that employment in machine tool shops had doubled in two years and that the 1940 production was valued at 1½ billion American dollars. Official reports on this industry are entirely lacking.

Prior to 1939 Japan's output was largely devoted to small and medium-sized basic tools, but with Europe at war and the source of supply in the United States in jeopardy because of our rearmament program, great efforts were made to construct large specialized tools copied from foreign models. That this was not entirely successful is evident from the continued and insistent attempts to buy these tools both here and in Germany.

At the same time government engineers evolved a small, simple, standardized lathe (called the S-type) that was manufactured in large numbers for use by the thousands of one-family shops in the industrial slums, each of which makes one simple part or in some cases performs a single operation on a part. A continuous pickup and delivery system supplied these shops with material, collected their product, and shunted it to other small shops for further processing. Finally it moved to the large factories where the finished article was assembled. This was the characteristic Japanese method of handling the problem of mass production. It was made more necessary by the fact that the expansion of large factories virtually ceased in 1938 when a ban was placed on the use of strategic materials in practically every type of civilian building construction.



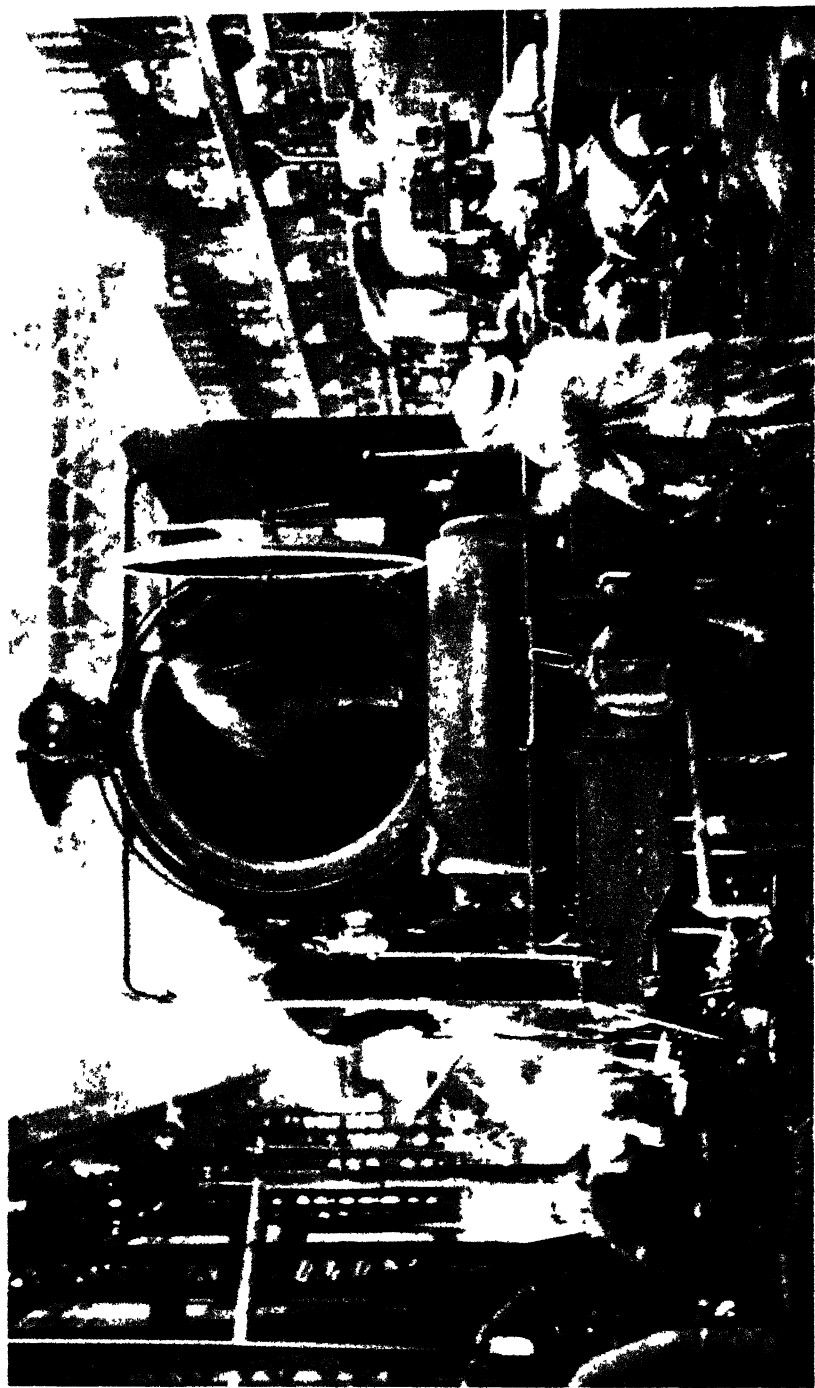


Japanese train, built, owned, and operated by the Japanese government Mount Fuji  
in the background (*Acme*)

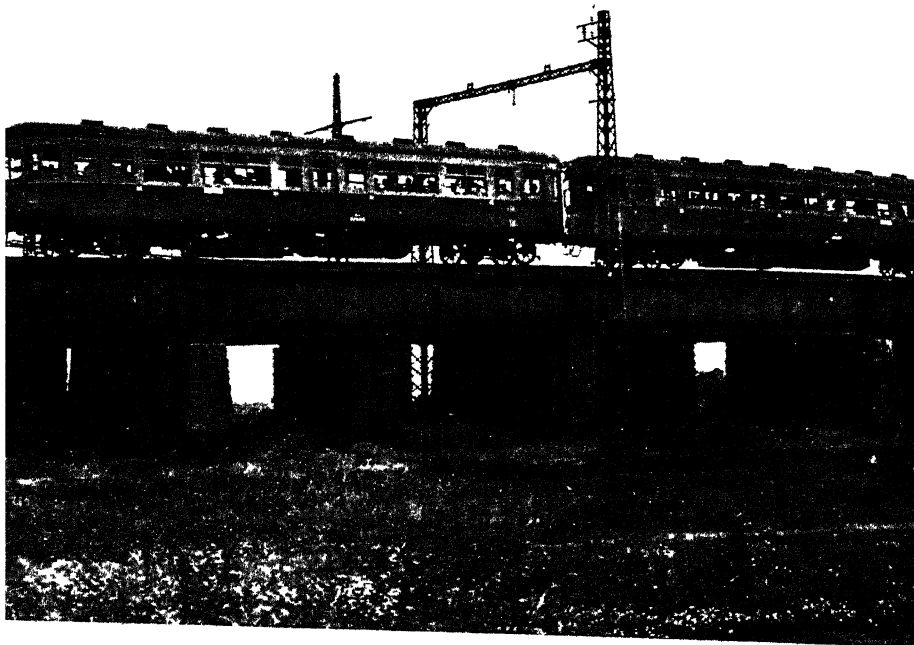


The Japanese copied American equipment and operational procedure, but always lagged behind. This car, with its filthy floor, looks like an American day coach of sixty years ago. The radio loud-speaker was installed in 1934. (Acme.)





Government railway repair shop at Omiya, 20 miles north of Tokyo. The usual periodic cleaning and overhauling of a locomotive takes five days in this shop, as opposed to twelve or fifteen hours in America. (Acme.)



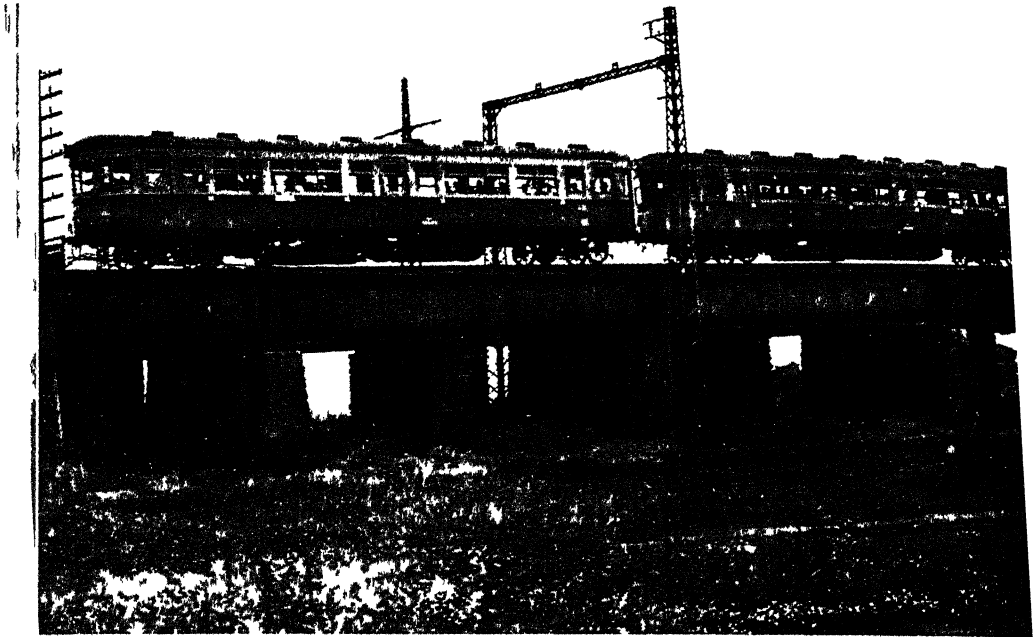
An experimental gasoline-driven train, near Tokyo (*International News*)

Heavy-duty electric locomotive, one of several types now in general use in Japan (*Acme.*)



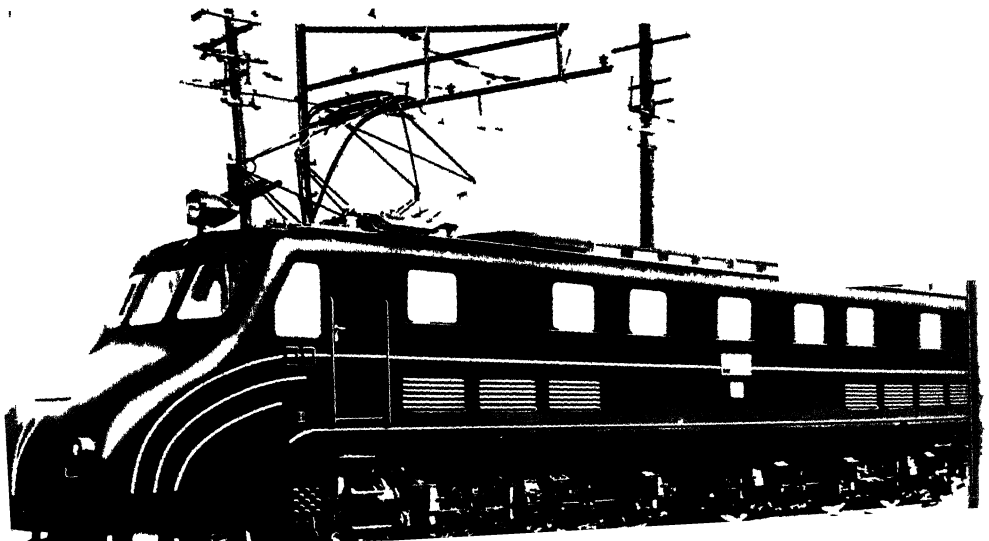


Typical two-trolley Japanese streetcar. The girls are learning to be trolley-car operators. (*International News.*)



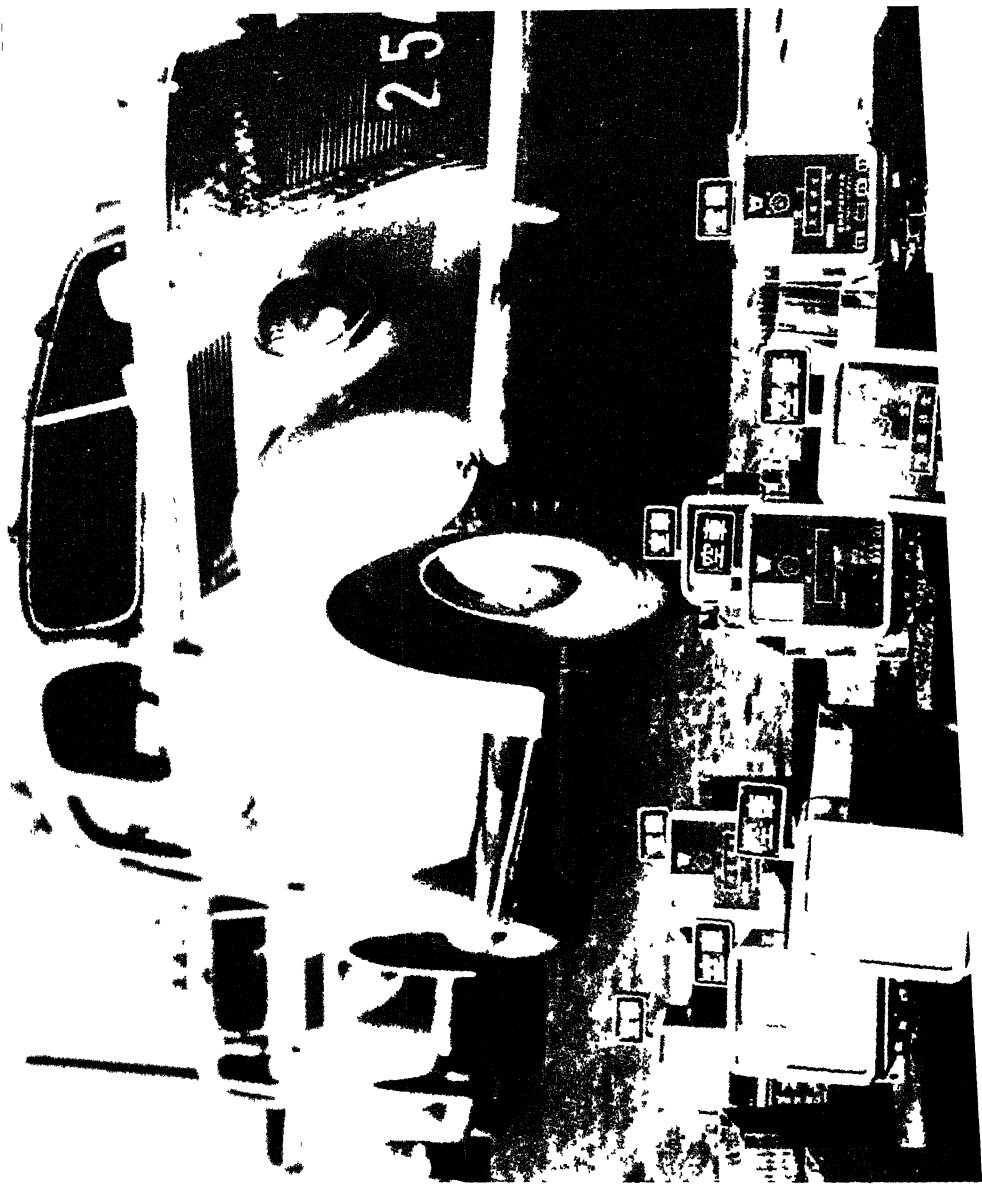
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Heavy-duty electric locomotive, one of several types now in general use in Japan  
(*Acme*)

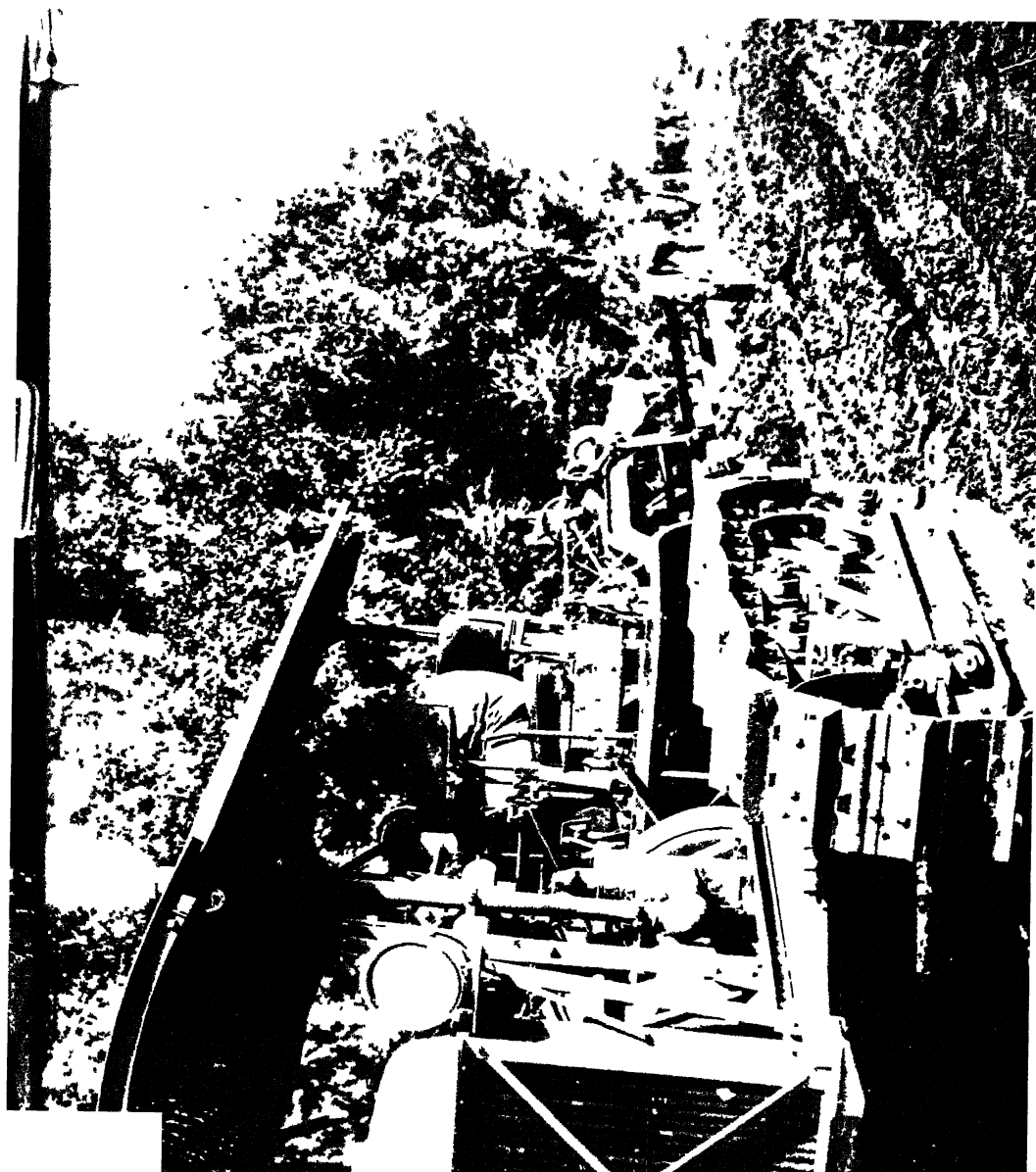




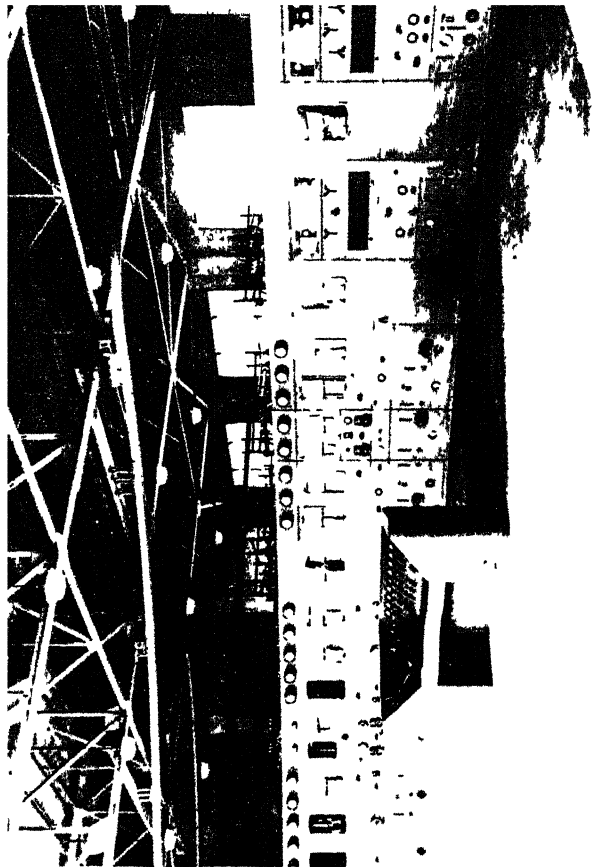
Typical two-trolley Japanese streetcar. The girls are learning to be trolley-car operators (*International News*)



Tokyo taxicabs. These are Japanese-built Fords. The objects in the foreground are taximeters. (Acme)

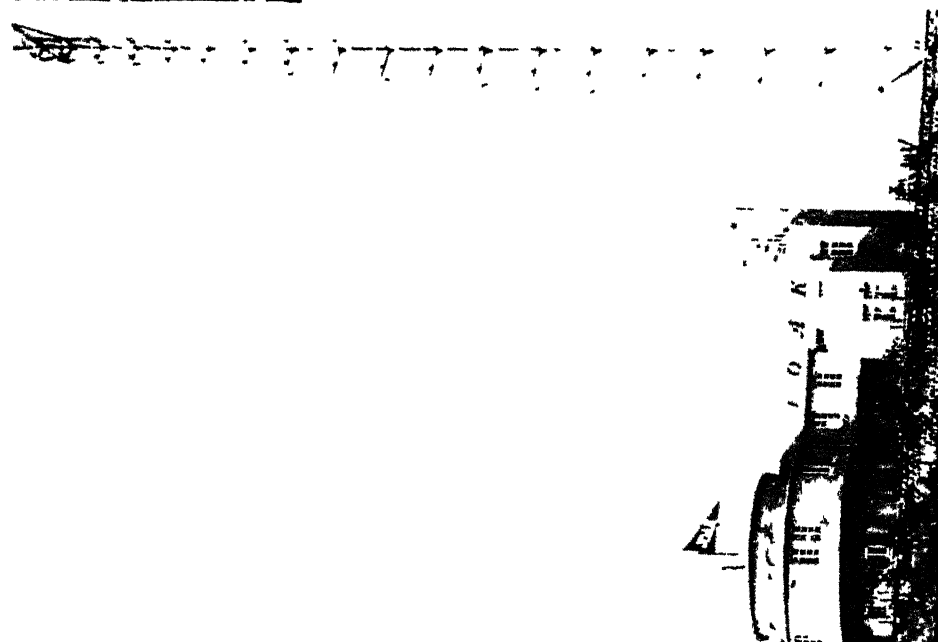


American-made road-building  
equipment cutting a highway  
through Japan ( *Wide World* )

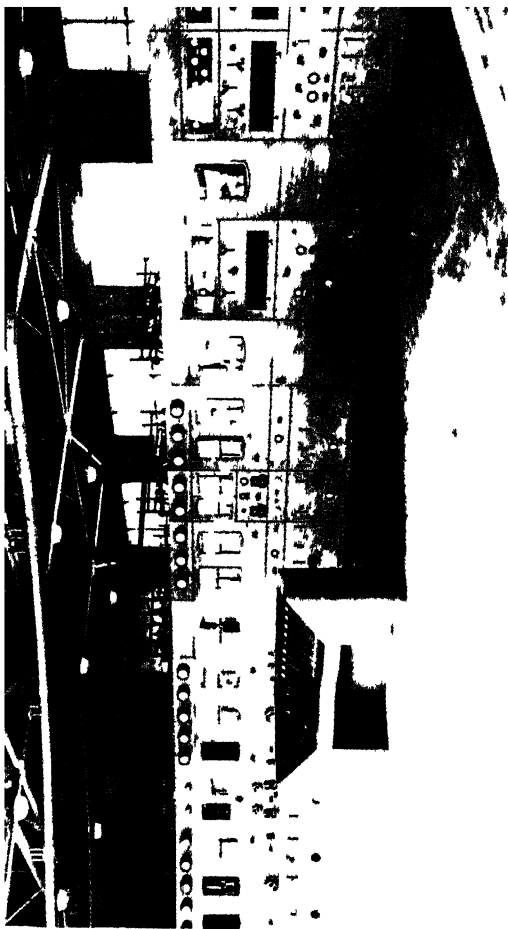


Japanese-built short-wave broadcasting transmitter. (Japan Times Ye.  
1938 )

Radio Station JOAK, Tokyo (Acme )







Japanese-built short-wave broadcasting transmitter (Japan Times Yearbook  
1938 )

Japanese industry as a whole is not heavily tooled. A private survey conducted just before the war—long after Japan's rearmament program was well advanced—indicated that the automotive and bicycle industries employed 63 machines to every 100 employees, aircraft 46, textile 41, and machine tool only 31. On an average this is about one-third the ratio in American industry.

Under war conditions it is impossible to tell how effective Japan's specialized machine tools are and whether they can compete with comparable imported products after the war. According to all precedents they cannot. Engineers who have worked in Japan say that some high-precision machines have been made, but only slowly and at great cost by a few selected mechanics. The ordinary commercial product follows the usual Japanese pattern—not good but very cheap. It sells for about one-third the price of similar American machines and is satisfactory where close tolerances are not mandatory. When a veteran American tool and die maker was shown the pictures in a Japanese tool makers' catalogue published in 1939, he said, "They look like copies of the stuff we were making thirty years ago."

Japan will probably continue to make small, cheap, and not very accurate tools of this type for domestic use and for export to other parts of the Orient, but there is no indication that she can compete with the western world in better-grade machine tools.

**Railroad Equipment.** Japan's major rail lines are owned and operated by the imperial government and hence have played an important part in furthering the national policy of promoting the development of heavy industries. The Railway Bureau began to promote the construction of facilities for manufacturing its equipment in Japan almost as soon as its lines were open to traffic. Ten years ago Japanese periodicals maintained that absolute self-sufficiency in the construction of all kinds of railroad equipment, from handspikes to locomotives, had been achieved "long ago." By 1935 the Japanese were exporting rolling stock valued at 30 million yen, most of it to Manchuria.

There were two government-owned factories in Kobe and Osaka that made or at least assembled the trucks and other under-gear of railway cars, and built car bodies and locomotives. However, all the big machine shops and foundries, such as the Mitsubishi and Kawasaki engine works, produced railway equipment before the war.

Foreign observers seem to agree that Japanese-built locomotives, both steam and electric, are better than most of the stationary engines and motors built locally for industrial use. This is because the railways, like the navy, can command the best the nation has to offer in labor and construction facilities. Other equipment, coaches and the like, is not up to American standards, but all of it is entirely adequate.

**Airplanes.** The construction of the Mitsubishi S-00 fighter plane is so illustrative of typically Japanese fabricating procedures that the discussion of the airplane industry will be based on it.

This fighter, one of three types usually referred to as "Zeros" in American newspapers, was a light, fast, frail monoplane with considerable speed, great maneuverability, a high rate of climb, and a relatively high operating ceiling. To achieve these qualities, which the Japanese army thought paramount for tactical purposes, the designers sacrificed durability, ruggedness, the safety and comfort of the pilot, and, to a degree, fire power. The pilot's compartment was small and cramped, even for a small man, and the pilot had no armor protection whatever. The result was that in spite of superior performance the Japanese lost an appalling percentage of the planes engaged in combat; several landed almost undamaged inside our lines with a dead pilot at the controls. These planes were carefully examined and tested by Allied army and navy fliers and construction experts.

According to a survey published in the September, 1942, issue of *Product Engineering*, the structure of the plane itself (that is, the wings and fuselage) was not a direct copy of any existing foreign model, but a synthesis of the features of several proved types of fighters that the Mitsubishi designers considered adaptable to their purpose. These designers showed great ingenuity in modifications to achieve lightness, structural simplicity, and a saving in material. Structural strength was sacrificed throughout. Considerable skill was shown in the use of wooden strips to reinforce aluminum members that bore stress. These members were distinctly weaker than the similar all-metal members used in American planes, but they were cheap and, to a degree, adequate.

Aerodynamically the design was good, probably better than the Japanese themselves realized. Navy fliers tested one undamaged plane in the condition in which it was captured, then gave it a coat

of paint to reduce air friction; they found that the speed was about 15 miles an hour more at the same test levels.

The operating equipment on the plane was a conglomeration of many foreign makes or, in the great majority of cases, copies or approximations of them, some excellent, some good, some poor. Most of the radio equipment was of German design, but a few American parts were used. The hydraulic equipment was of American design, but all the parts were Japanese-made copies, some with slight modifications. The compasses were American-made. Other instruments were copies of American types; some were marvelously exact, others crude.

Another report stated that the first American navy officer to enter the cockpit of a Mitsubishi fighter exclaimed angrily at the familiar appearance of the dials on the instrument panel. A closer examination soon disclosed that they were not American-made, but reasonably accurate facsimiles of well-known American types. The metal cases and their glass covers were invariably thicker, heavier, and of cruder workmanship.

The propellers used on this plane were identical with the Hamilton Standard 1937 design, with adjustable-pitch aluminum alloy blades. They were driven by an air-cooled radial engine that was an assembly of parts copied from several similar American motors. The machine work on these parts was adequate where adequacy was absolutely essential, but the amount of machining was reduced to a minimum. For example, the teeth of the gears were finished with fairly close precision, but the workmanship on the hubs and webs was rough.

Not only were the design and construction of this plane typical of Japanese-made mechanisms, but its performance was also. At first sight the S-00 appeared spectacularly effective, particularly in the early days of the war when its pilot was an officer with long and careful training and some combat experience and its opponent was an obsolete American plane handled by a pilot who had had no combat experience at all. Then, as in the case of so many other Japanese machines, its inherent faults began to appear. Wings sheered off in fast dives. It was vulnerable to machine gun bullets of all types. Comparatively short bursts from the 50-caliber guns that came to be standard for American combat planes could literally rip it apart. A small cannon shell would make this plane disintegrate

just as a tin can does when a large firecracker is exploded within it, and the lack of gas-tank protection made it highly vulnerable to fire.

Thus the Mitsubishi fighter, like so many articles of Japanese manufacture, was too frail and too cheaply constructed to continue to function effectively under conditions imposed by actual service. Losses sustained in the field ran from five to ten Japanese planes for one of ours.

**Vehicles: *Automobiles.*** According to the last report, just before the entire domestic production of automobiles was absorbed by the military two standard-sized automobiles, the Rokko and the Atsuta, were made in Japan. Apparently not more than five or six hundred of these cars were built for sale to the public in any one year, though a larger number may have been made for the government. The annual production of three makes of bantam cars, smaller than the English Austin, was about 4000. Again, this does not include those delivered to various departments of the government, civil or military. Both Ford and General Motors had assembly plants in Yokohama; they have been turning out trucks and light tanks since their seizure. The total output of all types of cars, trucks, and busses for 1936 was only 9628.

Japanese motor vehicles of all types show deficiencies in both workmanship and material. The quality of the workmanship on various cars of a single make or even on the various parts in one car varies from poor to excellent. Failure of parts due to inadequately processed steel is all too common. The use of tempered carbon steel springs, discontinued long ago in the United States in favor of special spring steel alloys, results in much breakage.

On the other hand, Japanese cars, particularly the small ones best suited to local conditions, can be made very cheaply—at a cost that permits their sale to the large low-income groups in Japan and in other parts of Asia.

The average Japanese willingly spends a much greater share of his income on transportation for pleasure than the citizen of any other nation except the United States. To most Japanese a holiday in normal times is best celebrated by taking the family on a trip. The excuse may be patriotic, religious, or esthetic—to visit a memorial to some national hero, to burn incense or leave mementos at a Shinto shrine, or to view some scenic object such as a row of cherry trees in bloom, a famous grove of evergreens, a mountain vista, or a strip

of beach. Actually the trip is the thing—the desire, easily understood by an American, to go somewhere.

Heretofore these trips were made perforce by common carrier, that being the only means available to the average man. This accounts to a degree for the proportionally large passenger traffic on the country's rail lines. It is understandable that the Japanese, although a seafaring nation, prefer to go by land when they travel for pleasure.

For these reasons, Japan will be a ready-made market for motor cars, the limiting factors for future sales being the low per capita purchasing power, the high cost of imported motor fuel, and the condition of the motor roads—that is, after the pre-war tax burdens and other impositions have been removed.

The reduction of other taxes, particularly those on land, that were imposed to support Japan's war machine will undoubtedly release a considerable amount of purchasing power, and a hitherto unheard-of percentage of the population will be able to buy small cheap cars. The cost of fuel will remain relatively high because most of it has to be imported, but the fuel consumption of such a car is small. The condition of the roads makes a small car imperative. There were 700,000 miles of alleged highways before the war; most of them were dirt tracks or roads improved by rock ballast only, and nearly all were so narrow as to be hardly negotiable by a large, standard-tread car. Even the so-called "scenic boulevards" along certain stretches of the Pacific coast are, as a rule, as narrow as our own highways that were constructed prior to 1916. The majority of city streets, including many byways in modernized Tokyo and Yokohama, are too narrow for anything but very small cars. Hence the great popularity of motorcycles and motor tricycles.

Making private car transportation available to a considerable portion of the Japanese is well calculated to induce a profound psychological change in a people that has been so greatly dominated by the herd instinct. For the average man in Japan, mobility and individual choice of direction have been restricted to travel on a bicycle, and he could not take a holiday on his bicycle because he could not take his family along. Reactionary Japanese have long decried the wide use of either bicycles or cars as promoting "individualism."

For this reason alone it would be excellent policy to encourage the

manufacture of a reliable bantam car in Japan, devoid of the accessories demanded by the American public in spite of the fact that they raise the cost of an adequately functioning machine by one-third to one-half.

*Bicycles.* Japan led the world in the production of bicycles. The annual output averaged one million complete vehicles per year during the pre-war decade, plus an enormous quantity of spare parts. Exports were several times greater than those of Germany, the United States, or Great Britain, Japan's nearest rival. The reason—Japanese bicycles sold on the world market for an average wholesale price of \$4 American money, or about one-fourth the cost of the apparently comparable American article.

Japanese bicycles are adaptations of both European and American types. When new they compare very favorably in appearance with the more expensive originals, but closer inspection reveals that the welding of the frame is uneven and crude.

The inferiority of the Japanese bicycle shows up promptly under rough use. The shiny enamel on the frame chips easily, and the nickel plating on the handle bars wears off immediately. All the bearing surfaces are extremely soft and soon wear out unless they are continually and generously lubricated. The bolts that carry heavy loads—those that keep the handle bars in place, for example—soon strip their threads, but will last a year or two if not adjusted too frequently. The European-type hand brake is even less effective than the model from which it is copied, and the Japanese version of the American coaster brake frequently fails after one vigorous application, giving the rider the disconcerting sensation of traveling the remaining downgrade on free-wheeling.

The tires are the poorest of all the equipment. Japanese tires wear out so quickly that they are not worth the labor of putting them on the wheels. It so happened that the original draft of this chapter was written in Hermosillo, the capital of the state of Sonora in Mexico. In this city of about 25,000, at least two-thirds of the bicycles were Japanese-made because of their low original cost. But all the tire replacements were American-made, even though one American tire cost almost as much as a new Japanese bicycle.

One of the factors that kept both the cost and the quality of Japanese bicycles so low was the keen competition among the parts manufacturers. The bicycles, at least the vast majority of them, were what is known in the trade as "assembly jobs." That is, spokes,

frames, wheels, hubs, chains, handle bars, and the rest were made by mass production in different factories. Several competing firms made a single comparable and often interchangeable part, and therefore they had to bid against each other for the business of the assembling plants that turned out the complete wheel for the market.

However, it is claimed that Japanese wheels lack durability for another reason. Particularly in the Far East, Japan's big market, the merchant who sells bicycles has a much more lucrative trade in tires and spare parts. The East Indian who buys a shiny new wheel for three or four dollars is in much the same situation as the American boy who buys his first secondhand car for twenty-five. Both spend a large part of their income and most of their spare time buying parts and making repairs to keep their vehicles in operation. But in each case the vehicle furnishes a better, or at least faster, means of locomotion than walking, so the purchaser has no regrets because he knows it is the best he can afford.

Needless to say, when the purchasing power of the lower-income group in any locality is so improved as to permit the purchase of better vehicles, no more Japanese bicycles will be sold.

### CHEMICALS

The manufacture of chemicals of all types held third place in point of money value during the immediate pre-war years, and hence ranked ahead of the category of machinery and vehicles just described. However, as a considerable part of the chemical output during this period was explosives and munitions, the preceding category is more significant for the purpose of this book.

Japan's output of chemicals, including chemical fertilizers, was valued at 2 billion yen in 1936, as opposed to 936 million in 1932, and nearly 300,000 people were employed in all phases of the industry. The *Tokyo Asahi* gave 3469 million yen as the value of chemical production for 1938. How much of it was explosives was not specified.

The production of explosives, fertilizers, bleaches, dyes, and other industrial chemicals comes under the heading of heavy industry. Most Japanese writers include the manufacture of glass and bulk celluloid in this category. The production of pharmaceuticals, cosmetics, and various types of prepared insect repellents, all consumer goods, is classified as light industry.



**Chemical Fertilizer.** Large supplies of superphosphates, ammonium sulphate, and calcium cyanamid are essential to maintaining the fertility of Japanese fields, particularly rice fields, under intensive, continuous cultivation. Other chemicals are used but these bulk far larger.

Production of superphosphates exceeded 1 million metric tons in 1932 and rose to 1,625,000 tons in 1937. Production of ammonium sulphate was 684,887 metric tons in 1932 and 1,340,000 tons in 1937. Imports exceeded 380,000 tons in 1937, in spite of expanded production, because Japan was frantically building up reserves. Calcium cyanamid production was more than doubled during those years, reaching 279,700 tons in 1937.

Most of this production came from three large firms, the Nissan Chemical Company, the Electro-Chemical Company, and the Showa Fertilizer Company. There were a dozen other substantial producers, including all or nearly all of the large companies engaged in smelting and refining.

Production of ammonium sulphate necessitates large supplies of electric power, coke, coal gas, and sulphuric acid. All these are available in Japan proper, though coke from domestic coal is limited. The process is complicated and the necessary equipment is expensive. The first substantial domestic production was developed during World War I, but the plants established then could not compete in the free market that prevailed after the war. Ammonium sulphate could be imported more cheaply than it could be made. However, as the same plants produced military explosives in time of war, it became the policy of the successive governments to maintain a market for the domestic producers at a high level of profit. Annual earnings of some of the companies ran as high as 28 per cent after 1931, and average annual dividends were around 10 per cent.

Under this incentive plant expansion accelerated rapidly. In 1939 spokesmen for both the government and the chemical industry maintained that plant capacity was large enough to supply agriculture's "normal" need for 1,000,000 metric tons a year and at the same time turn out enough explosives to meet the demands of the army and the navy, plus a surplus to sell to warring Europe at a fancy price. That this was a dream that did not come true is evident from the accounts published in 1941 decrying the "necessary shortage" of all types of commercial fertilizers and the declining acre yield that resulted in many crops.

However, plant capacity was so greatly increased that the post-war output of ammonium sulphate can probably supply all of Japan's own needs and furnish a surplus for export—that is, if production costs are low enough to allow Japanese producers to meet the world price. Costs will be largely determined by the post-war price of coal, electric power, and sulphuric acid.

Post-war production of superphosphates will be largely dependent on the same conditions. This material is the product of the action of sulphuric acid on phosphate rock, the latter imported, most of it from the South Sea Islands. Here the limiting factor is the production of sulphuric acid, for phosphate rock can be transported to Japan in Japanese ships at low cost.

**Sulphuric Acid.** Not only is the production of chemical fertilizers dependent on large supplies of sulphuric acid, but this acid is the basis of many other industrial processes, notably the conversion of wood into such diverse products as newsprint and rayon.

Sulphuric acid is made from iron sulphides, of which Japan has large reserves,<sup>3</sup> and from the by-products of the smelting and refining of copper ore. That this latter was probably the more important source is shown by the fact that the plant operated by the Sumitomo Chemical Company at the great copper refining plant at Niihama had a capacity of 100,000 tons of acid a year as long ago as 1934. This plant has since been greatly enlarged.

Large plants of unspecified capacity work with the by-products of the Imperial Steel Company and several of the smelters owned by the Mitsui, Mitsubishi, and other interests. All are comparatively new and were built under the direction or according to the specifications of German or American engineers.

On the other hand many of the plants that directly utilize the cheap and plentiful sulphides are old and some are quite primitive. Their combined output is said to be smaller than that of the well-equipped by-products plants.

Therefore if, as indicated, copper refining proves to be uneconomic in Japan after the war there is likely to be, at least temporarily, a serious dislocation in the very vital production of sulphuric acid.

**Alkalies.** In their late pre-war issues Japanese periodicals claimed that there was sufficient plant capacity in Japan proper to manufacture all the commoner base compounds used in industry, with

<sup>3</sup> See Chapter V on mining.

the exception of potassium salts, of which 400,000 tons were imported in 1937. This claim is impossible to substantiate or refute because actual figures on production are not available and the import picture is confused by military purchases.

**Petroleum and Synthetic Petroleum Products.** In 1941 there were twenty-five petroleum refineries in Japan proper, with a total daily crude capacity of about 62,000 barrels, and an indefinite number of small primitive plants, most of them in the oil fields of west-central Honshu, whose combined intake was less than 1500 barrels daily. Eight plants, totaling about one-half of all Japan's refining capacity, are concentrated in the Yokohama-Isurumi-Kawasaki water-front area. Other large production centers are located at or near Kudumatsu on the Inland Sea about sixty miles east of Shimonoseki (8000 barrels) and in the Osaka-Amagasaki area (7000 barrels).

The so-called "cracking" capacity for the production of gasoline hardly exceeded 15,000 barrels a day at the outbreak of the war. This was distributed among twelve plants, all of them built under the supervision of American engineers and using either the Cross or the Dubbs system. The Mitsubishi plant at Kawasaki is said to produce 90-octane aviation gasoline, but 87-octane is thought to be standard for most Japanese airplane motors.

It is doubtful whether there was any great increase in refining capacity in Japan proper during the war. For one reason, the shortage in shipping that developed immediately after the beginning of the war made it more feasible to build refineries near the conquered oil fields in the East Indies. For another, the Japanese have few men skilled in constructing and installing modern, and therefore complicated, refinery equipment; even with the help of German technicians wartime construction must have been limited.

Until the conquest of the Indies, most of the time and energies of the Japanese petroleum engineers and research technicians were expended in attempting to develop petroleum substitutes. From time to time during the past twenty-five years glowing but rather vague accounts have been published of the successful conversion of vegetable oils, various fats, gum camphor, pine resin, acetylene, and several astonishing mixtures of organic compounds into gasoline, benzine, and lubricating oils. These were laboratory experiments and, whether successful or not, were commercially impractical.

Experiments in the liquefaction of coal began during the First World War, and the processing of oil shale also about the same time.

Commercial production commenced some years later, but the output from both processes was unimportant because production costs always exceeded the price of imported petroleum products.

However, in 1936 the imperial navy instigated a seven-year program of expanded production, particularly coal liquefaction. Several new plants with a total annual capacity of 3,700,000 metric tons (28 million barrels) were constructed; of this, 2 million metric tons (16 million barrels) were to be produced in Japan proper. This goal was never realized because of the difficulty in obtaining sufficient machinery from Germany. The total production of all types of synthetic petroleum derivatives, including alcohol mixtures, was about 4 million barrels in 1939.

The total production of oil from shale reached 2½ million barrels in 1938. Much of it was produced in Korea and Manchuria, although one refinery in Yamaguchi prefecture with a daily capacity of 4000 barrels is said to have operated entirely on shale.

It is doubtful whether shale-oil production will be economically feasible after the war and it is certain that coal liquefaction will not be. Certainly Japan will have more than ample petroleum processing capacity to meet all her peacetime needs unless the damage from bombing is extremely extensive.

**Dyestuffs.** During World War I, when supplies of German dyes were cut off entirely, the demands of Japan's rapidly expanding textile industry forced the price of all dyestuffs up over 1000 per cent. Hitherto there had been little commercial production in Japan, but a considerable amount of laboratory experimentation had been conducted in this field. Under this strong price stimulus, commercial production grew rapidly, only to collapse after the war when forced to compete with German and American dyes. The government kept the industry alive by tariffs and subsidies, but it existed rather precariously until 1931, when the price of all imported articles rose sharply because Japan went off the gold standard.

Production again grew rapidly, and in 1933 Japan began exporting dyes in considerable amounts, chiefly to Japanese-owned textile mills in Manchuria and China. In 1936 exports rose to 24,000 metric tons, and imports were only a little more than 2000 tons. However, the ton value of the imports was nearly ten times that of the exports. In other words, while the Japanese could make cheap dyes in large quantities, they had not yet been successful in producing the more expensive "non-fading" dyes.

The situation in 1938 was as follows:

Basic dyestuffs. These are largely aniline, used in dyeing cotton, silk and hemp.

Production	4,500,000 yen
Exports	700,000 yen
Imports	400,000 yen

Direct dyestuffs. Benzene products.

Production	9,000,000 yen
Exports	700,000 yen
Imports	800,000 yen

Mordants. Important in dyeing woolens.

Production	1,000,000 yen
Imports	400,000 yen

Acid mordants. Chrome compounds.

1938 figures not released. Production in 1936 valued at about 4,000,000 yen. Imports at about 400,000 yen

Sulphide dyes.

Production	3,600,000 yen
Exports	2,000,000 yen
Imports	300,000 yen

Indigo and other organic dyes.

Production	5,300,000 yen
Exports	2,400,000 yen
Imports	400,000 yen

These figures are from the 1941 yearbook of the *Osaka Mainichi*; although they are unofficial and incomplete they give a fairly adequate picture. Tonnages are not included, but it is evident from other sources that Japan continued to export cheap dyes in quantities and to import increasingly smaller amounts of expensive dyes.

It is also obvious that during World War II Japan's dye industry gained neither profit, experience, nor production capacity because the textile industry ceased to operate except for making uniforms and other military supplies and a base minimum of ersatz material for civilian consumption. Moreover, whenever it was feasible, dye factories were converted into munition plants.

The post-war production potential will probably be roughly that of 1938, after the reconversion of some plants.

**Soaps and Cosmetics.** A daily hot bath is a national necessity in Japan—though there has been a wartime hot-water famine of late—and every bath is traditionally preceded by vigorous soaping and rinsing, hence soap making is an important industry. Normally it consumes 90,000 tons of fats a year, which in peacetime included 55 per cent hardened fish oil (a domestic product), 15 per cent coconut oil (imported), 8 per cent resin (chiefly domestic), 2 per cent palm oil, and 20 per cent various tallows and fats, most of them imported. Under the Trade Control Law of 1937 the use of imported fat was strictly limited and soybean, rice bran, and fish oils were substituted. As the wartime need for glycerin and other fat products grew, soap making was sharply curtailed.

Post-war production will probably regain the immediate pre-war level, with consumption of materials about the same as the above. Imports will be limited to a few luxury lines; exports, principally to Asia and the East Indies, should range from 1 to 1½ million United States dollars a year.

The Japanese are almost as cosmetic-conscious as Americans and, considering the vast difference in the average annual income between the two groups, they spend proportionally as much money on toilet articles, dentifrices, and the like. A surprising amount of these commodities was found in the kits of Japanese soldiers.

The use of cosmetics goes back to medieval times when a heavily powdered face with a well-drawn eyebrow line was the badge of both the professional beauty and the lady of wealth and position. After Japan was opened to foreign trade, French and then American cosmetics were introduced and became popular with those who could afford them. Domestic imitations were soon being produced to sell for a small fraction of the price of the imported articles and this in turn led to a vast expansion of the market. American packaging, merchandising, and advertising methods were copied. By 1930 an exportable surplus was produced and in 1937 exports valued at 2 million dollars were sent to Manchuria, India, and the Dutch East Indies, one item of which was frankly journalized as "face paint." This may seem small to one familiar with America's billion-dollar cosmetic industry, but in bulk it probably represented about ten times the amount of American toilet articles of the same value.

Here again is an industry that is practically without competition

at home or in its own particular export field because of its low production cost. On the other hand its products are essentially cheap imitations of American items and cannot compete with them on a market where customers do not count the costs of luxury items in cents and fractions of cents.

Under a system of free economy the industry should grow both in Japan and throughout Asia, particularly with the increase in real wages among the lower-income groups.

**Drugs and Remedies.** During the long Tokugawa embargo on foreign ideas there was a small but persistent bootleg traffic in Dutch medical books among the Japanese intelligentsia. At times the authorities winked at the acquisition of foreign medical knowledge by Japanese students, or secretly encouraged it, at other times persecutions were persistent and severe. However, a seed bed for the propagation of modern science had already been prepared when the ports of Japan were opened and a medical school was established in Tokyo under German instructors shortly after the beginning of the Meiji regime.

The study of medicine attracted the best minds in Japan, but the only real contribution the Japanese have made to the science has been in the field of bacteriology, although they have done adequate and painstaking work in biochemistry and preventive medicine.

The manufacture of standard, so-called "ethical" drugs and remedies developed before the beginning of the present century and soon grew to the proportions of big business. The Japanese became as nearly self-sufficient in the preparation of pharmaceuticals as any nation could be. Usually when a foreigner inquired about a particularly modern-looking factory in a Japanese city he found out that it was engaged in producing either drugs or patent medicines.

The Japanese are not a healthy people. They are subject to all sorts of respiratory and digestive ills, and venereal diseases run rampant among them. They have pronounced neurotic tendencies that produce many hypochondriacs. They are even more inclined to believe patent medicine advertisements than are Americans. Furthermore, they are great faddists; if one particular remedy catches the public fancy its sales are limited only by the production capacity of its factory—as long as the fad lasts. All sorts of nostrums have had tremendous sales from time to time; any well-advertised remedy, proprietary or not, finds a wide market, first in Japan and then in all parts of the Orient where Japanese trade extends.

Complete and authentic figures on the over-all production of standard drugs, biochemicals, vaccines, inoculations, and the like are unobtainable even for pre-war periods, moreover, they would be of little value because the productive capacity for all medical supplies was greatly increased after 1937 and this expansion continued at least until 1943. Japanese surgical equipment captured on the field during the war ranged from good to poor and the supply often seemed to be inadequate, but the supplies of drugs were more than ample. Some items, vitamin pills for example, were found in almost ridiculously large amounts in captured areas. The occasional local lack of certain drugs appears to be due to transportation deficiencies rather than production difficulties.

In the production of narcotics, particularly cocaine and heroin, Japan's capacity is certainly far too large. Japan and Japanese-controlled Manchuria have been the greatest single source of supply for the illegal traffic in these drugs.

It seems obvious that Japan's capacity to produce nearly all kinds of medical supplies will exceed the domestic demand after the war; hence the surplus for export to the usual Asiatic markets will be considerable.

**Glass and Glassware.** For a number of years before the war Japan's production of glass was exceeded in value only by that of the United States and at times by that of Belgium. In the year 1932, when many of the glass factories in both this country and Belgium were shut down because of the collapse in price, the Japanese claimed world leadership. On the basis of plant capacity she was certainly second in the pre-war years. Owing to the fact that a large proportion of her glass is low grade and exceedingly cheap, the actual tonnage produced was probably considerably in excess of Belgium's.

In 1937 the total Japanese production was valued at almost 80 million yen (\$28,000,000), exports exceeded 33 million yen, and imports were only 1½ million yen—the latter high-grade plate, sheet, and optical glass. Imports have been decreasing steadily for ten years.

Early efforts to make sheet and plate glass in Japan failed because of mechanical imperfections in processing and chemical impurities in the sand used. The first successful glass factory, established in 1876, made bottles for domestic trade, but there were no large establishments until the Mitsubishi concern organized the Asahi Glass Company in 1906. The output of sheet glass continued to be



small until mechanical cylinder blowers were installed in 1916 by the Asahi and Nichibei glass companies, the latter a Sumitomo subsidiary. Both enjoyed a period of great expansion for the next three years and captured most of the markets that had been supplied by the Belgium and German glass industries. In 1919 production rose to some 64 million yen—about \$32,000,000 at the exchange rates then current—the highest dollar value ever attained.

The Sumitomo interests sold the Nichibei plant to an independent syndicate in 1918, and in 1919 the latter secured a license to make plate glass by the American Colborn method. This concern still produces most of Japan's plate glass, the Asahi company controls the greater part of the sheet glass market.

When exports from Europe and America began to appear on the world market after 1920, the war-born Japanese industry collapsed because its product was still inferior. Imperfections due to faulty processing were common and the glass had an undesirable color, usually greenish, resulting from the manufacturers' failure to eliminate iron compounds and other impurities from the materials employed. In beer and wine bottles, however, lack of clearness was unimportant, and the Japanese became the world's largest exporter of beverage bottles, although they were still struggling with the problem of improving their window glass. In 1930 when prices were collapsing after the great financial panic, the Japanese began flooding the market with window glass that was better made than formerly. Although its average quality was still inferior to that of foreign glass, it could be sold profitably at depression prices.

A great deal of Japanese glass goes into the manufacture of specialty items, some for export—tableware, electrical fixtures, beads, imitation pearls, and cheap ornamental objects—and some for home consumption, such as the glass globes universally used by Japanese fishermen in lieu of cork floats.

Little reliable information is obtainable on Japan's production of various high-grade, super-transparent kinds of glass used in making lenses and other optical instruments. A large amount of optical glass is used, for probably a greater percentage of the Japanese wear eyeglasses than is true of any other people. The Japanese claim a large and proficient production of flint glass, the component of most lenses, but give no figures, probably they grind most of their spectacle lenses from domestic glass. The same thing holds true for

the simple lenses made for the thousands of cheap Japanese cameras that have been sold during the past decade. Whether the complex anastigmatic lenses (combinations of crown and flint glass) used in the Japanese imitations of German miniature cameras are made from domestic glass is not known.

There is much conflicting evidence as to the value of these lenses. This is probably because there is a great variation in quality in all Japanese optical instruments, even those that are apparent duplicates. How much of this is due to material and how much to workmanship cannot be estimated.

Certainly the preponderant percentage of optical glass imported during the past ten years has gone into the lenses and prisms used in range finders, telescopes, and field glasses that have been manufactured in great numbers for the military.

To sum up: Glassmaking is one of Japan's most profitable industries and one of the few large manufacturing enterprises that has ample domestic supplies of raw material. Production capacity is large and production facilities for the commoner kinds of glass and glassware are modern. Great quantities of inferior glass, good enough for the purposes for which it is intended, can be made to sell very cheaply. However, there is evidence that the cost of making the best grades of glass is disproportionately high, partly because of the small number of highly skilled technicians and the long-time accumulation of traditions by the industry.

**Rubber Goods.** In 1936 Japan imported 63,888 metric tons of crude rubber from Malaya, India, the Dutch East Indies, Indo-China, and British Borneo at a cost of 73 million yen. From this, plus cotton fabric and other ingredients, were manufactured goods valued at 150 million yen. A little less than one-third of these products (40 million yen) was sold abroad, the principal items of export being rubber or rubber-soled shoes, tires, and toys.

The Japanese normally manufactured between 45 and 50 million yen worth of rubberized footwear. About two-thirds of this was of the tennis-shoe type, a substantial proportion being exported. About one-third—the annual production exceeded 16 million yen—was the rubber-soled *tabe*, a particular type of Japanese sock or foot-mitten, worn with saddles or clogs, in which the big toe has its own compartment. The rubber sole is designed to protect the feet from the mud and rainwater puddles that are exceedingly prevalent in Japan

about ten months of the year. *Tabes* are made exclusively for the Japanese trade, the few that are exported going to the Japanese colonies and dependencies.

In common with most Japanese rubber products, the ordinary fabric-and-rubber shoes produced for export are not as durable as American shoes of similar type, but they are very cheap and give fair to good service for the price paid. Large quantities of these shoes were produced from 1936 to 1939 in anticipation of greatly increasing overseas sales; when this increase was not fully realized the surplus went to the army's stock pile. Many if not most of the Japanese soldiers who swarmed through the south Pacific area early in 1942 wore these tennis shoes.

The last complete figures on the production of all types of rubber tires were for 1935 and put the total value at 45 million yen. Probably the notoriously poor bicycle tires constituted the greater part of this. From all information received, there was considerable variation in the tires as to durability, but on the whole they were poor on all counts—the fabric was weak, the workmanship poor, and the vulcanizing faulty.

Information on the quality of automobile tires is similarly conflicting, probably because there is great variation here also. That Japanese-made tires overcame all competition on the domestic market is indicated by the fact that imports in 1936 were worth only 14,000 yen as against 3,800,000 yen, the value of tire imports in 1930. After 1937 nearly all the output was for military vehicles. Whether the military demands resulted in an over-all improvement in durability will not be revealed until reports on tests of captured Japanese vehicles are made public.

However, it is known that as late as 1932 the Japanese manufacturers were using chemical components and processing methods that had been discarded by the American rubber industry as unsatisfactory at least a decade earlier. Certainly there is no indication that the Japanese will be able to compete on the world market in this field.

Other rubber items that the Japanese manufacture in some quantity are belting (8 million yen), inner tubes (4 million), toys (4 million), and assorted mechanical and household appliances (about 2 million). The United States made substantial purchases of toys during the pre-war years, but other imports of Japanese rubber goods declined sharply after their swift rise during the depression years.

Japan's important outlets for these articles continued to be China, India, Malaya, and the Dutch East Indies—always the great bulk purchasers of cheap goods.

### FOODSTUFFS

In 1936 the total output of the factories engaged in the commercial processing of foodstuffs (including milling, cooking, baking, freezing, drying, canning, brewing, and bottling foods and beverages) was valued at 1259 million yen (\$350,000,000) and their employees numbered nearly 300,000. These figures do not give a true picture of the size of the entire food-processing industry in Japan because data on factories employing less than five paid hands—which means the majority of the plants that process native-style food for local consumption—are not included. It is probably safe to say that the 300,000 workers mentioned above were engaged principally in processing food for export and for military reserves. At least twice that number made their living by processing food and drink by more primitive methods for domestic consumption.

The canning of fish, fruit, and vegetables has been discussed in the chapters on agriculture and animal industries. It must be emphasized here that the whole Japanese canning industry has been geared to produce goods for foreign markets; in this case the markets most sought, and sought successfully, were in Europe and America. Whether they will be available to Japanese canned products after the war, at least to the extent of their former purchases, cannot be foretold. The revulsion of all the English-speaking countries, Japan's best pre-war customers for canned fish, will certainly be stronger against foodstuffs than any other commodity, despite the world shortage that will continue for some time. This may be somewhat overcome by marking goods made in Japan with the seal of the occupation authority, otherwise, the entire canning industry will have to be curtailed and reoriented to supply the domestic and nearby Asiatic markets.

The production facilities of all or most of the canneries were greatly expanded under government sponsorship even after 1938, in a vigorous last-minute drive to produce commodities that would readily bring in foreign currency. Over-production was not a problem at that time, because any foodstuffs that did not sell abroad went into the military stock piles. Tons of canned salmon bearing the

labels of well-known export brands were captured by the American army in the Aleutians.

Although the Japanese people have not been able to buy the larger part of their cannery pack for home consumption, they have always bought large quantities of dried, pickled, salted, and, lately, frozen goods. Probably 200,000 paid workers are regularly employed in these types of processing.

The production of sake, a fermented beverage made from rice and the traditional drink of the Japanese, is an important industry, though it has been declining for some years and was radically reduced during the war to conserve rice. Two hundred and twenty million gallons were produced in 1935 and 167 million in 1936. Exports were unimportant, most of them going to Manchuria and the rest to Japanese living abroad.

The production of beer has been steadily increased since 1925. Over 77 million gallons were brewed in 1938 and more than 2 millions were exported. The Japanese claim to have sold beer in "every country in the world, including Germany," but most of these sales were too small to appear in the usual reports. The bulk of the exports went to Asia and the Indies.

The milling of flour has declined since 1935, when about 50 million 130-pound bags were produced, in contrast to 38 million bags in 1937. The reduction was due to the decline in wheat imports. The flour is of too poor quality to find favor abroad. Exports were limited to Japanese-dominated territories.

#### CLAY PRODUCTS

In 1936 Japan manufactured clay products valued at 330 million yen, and 113,000 full-time workers were employed in the factories that had more than five paid workers. The raw material used is mostly native clay, though considerable kaolin is imported for the production of the better-grade porcelains and chinaware.

The technique of producing ordinary earthenware and glazed porcelain was acquired by the Japanese from the Chinese or Koreans along with the rest of the Chinese cultural complex. The Japanese developed some excellent pottery during the late Middle Ages, among it skillful imitations of Chinese masterpieces. The production of certain glazes and the proper application of certain colors and combinations of colors became jealously guarded trade secrets

that were the property of a family or a local potters' association. Cloisonné of great beauty was and still is produced in Kyoto.

Japanese tableware and porcelain art objects were among the earliest exports to reach Europe and America after the opening of unlimited foreign trade. These exports increased substantially as the fad for oriental objects grew in England and the United States, but the best porcelains, the product of established artists, seldom left Japan. The over-all quality of the output of the industry—which was still using the traditional handicraft method—deteriorated considerably as production increased and prices decreased because of competitive selling.

Power-driven machinery came into use about 1912 and the production of popular-priced tableware increased enormously. Japan ranked third after Germany and England in the export of these commodities. Annual production values oscillated between 70 and 80 million yen for several years, and exports between 30 and 35 million. Production rose steadily in the 1930's, reaching 93 million yen in 1936; exports were about 43 million, a little less than half going to the United States. In 1937 production was valued at 95 million yen, and exports rose to 53 million.

The best Japanese chinaware is still produced by handicraft methods and is the work of artists of distinction. Its production is naturally limited. Second in quality is the better-grade commercial chinaware, meticulously symmetrical and well balanced, and of good color and finish; it is comparable to the better china made in Europe. But the mass-production china, the cheapest in the world, is poorly made, unsymmetrical, and of dubious color and finish. The cost is so low that it undoubtedly represents his money's worth to the customer who cannot afford better.

In addition to producing vases, figurines, and other strictly ornamental objects both for the home market and for export, the Japanese made a wide variety of toys from clay—everything from dolls to miniature guns. These toys had a wide sale at home but efforts to develop an export market for them has been only spasmodically successful.

The manufacture of industrial earthenware articles—pipe, tile, electric insulators, and the like—increased in importance up to the beginning of the war. After 1931, and particularly after 1937, earthenware substitutes for metal were produced in large quantities. For example, all the iron mailboxes began to disappear from the streets;

ceramic duplicates replaced them. Tile pipe replaced metal pipe wherever possible. Even iron fences and grilles were replaced by tile counterfeits that were heavier and more formidable-looking than the originals.

Most mass-production ceramics of all types are manufactured in and around Nagoya, which has been the shipping port for the industry. Fine porcelain and cloisonné are made in both Kyoto and Nagoya, though minor production centers are scattered throughout Japan.

### WOOD PRODUCTS

**Timber.** The annual output of Japan's wood products industry was valued at about 300 million yen during the late pre-war years; it showed a continually healthy increase and employed some 100,000 workers. These figures do not include the wood pulp and paper-making industries.

In addition to her own production of timber discussed earlier, Japan imported about 35 million cubic feet (420 million board feet) from the Pacific Northwest, about 17 million cubic feet of assorted softwood and hardwood from all areas, and half a million tons of wood pulp for the production of paper and rayon.

Most of the imported hardwood—mahogany, ebony, satinwood, teak, and the like—is used in the production of plywood and veneers, in which the Japanese have been outstandingly successful. Their ingenuity in producing paper-thin veneers has made for great savings in imported timber. Just before the war 10 million dollars' worth of plywood was exported annually, most of it to the United States. The Japanese invented a packing case with plywood sides for radios, refrigerators, furniture, and the like, which has been adapted and improved in the United States and is now in universal use. Containers of this kind, all of them made in Japan, were used almost exclusively for the vast shipments of crepe rubber from Malaya and the Dutch East Indies to the United States.

Wood is more important to the Japanese than to any other modern industrial nation. Wood and wood products are the universal building materials. Household utensils that are made of metal in any other country are made of wood. Bathtubs are almost invariably of wood, and a wooden box filled with clay is the Japanese equivalent of a kitchen stove. The manufacture of wooden toys is an important

industry that had a large export trade before the war. During the same period a vogue for modeling and carving in wood plastic and solidified sawdust developed among Japan's top-ranking artists.

The use of sawdust and other by-products of woodworking in making plastics, combustible gases, paper, food, and various ersatz materials has been under study by the Bureau of Physical and Chemical Research for several years, but all the reports on these activities have been the typical Japanese mixture of boasts and evasions that make it impossible to determine whether any progress of economic importance has been achieved. It is known that the Japanese have made strenuous efforts to learn all about the considerable German advance in this field.

*Paper.* Like wood, paper is more important in the Japanese economy than in most other industrial nations, despite the increased use of cardboard cartons in commerce everywhere. The average Japanese lives in a house that has paper walls—at least the interior partitions are made principally of paper, and perhaps one or more of the outside walls as well. He hoards scrap paper for a multitude of domestic purposes. In the summer he wears an imitation Panama hat made of paper, and in the winter he pads his clothes with paper to keep out the cold, if he is too poor to buy woolen cloth or cotton padding.

Japan held fifth place in 1937 among the nations that produce paper, her output was 2 billion pounds, valued at more than 450 million yen. Forty thousand workers were employed in the industry, and more than 800 types of paper were produced. Here again employment and production figures are inadequate for the usual reason—they ignore the thousands of small domestic producers who make most of the Japanese-style paper.

The distinction between Japanese-style and foreign-style paper is important. The annual output of both is large, but production methods and materials are very different.

All foreign-type paper is machine made by methods introduced from Europe and America. Most of it is made from wood pulp, the far greater part is newsprint. Japanese newspapers used about one billion pounds a year in peacetime. Although exact figures cannot be obtained, it is generally believed that Japan's per capita consumption of newsprint is the highest in the world. This is due largely to the high literacy rate—over 90 per cent—the fact that the great majority of the people live in or near big cities, and the vigorous



circulation-getting campaigns put on by the metropolitan dailies during the recent past. A considerable amount of better-grade foreign-style paper is made from rags and other fibers, the total exceeds 2 million pounds, four-fifths of it coming from the mills of the Oji Paper Company, which is owned by Mitsui. This paper company owns the *Osaka Mainichi* newspaper, which in turn owns the Hokkaido Railroad Company and several power plants, steamship lines, pulp mills, and allied enterprises.

Although large corporate factories produce practically all of the foreign-style paper, the Japanese-style paper is still made by traditional handicraft methods from the same materials that have been in use since paper making was first learned from the Chinese centuries ago. Most notable of the materials are various fibers produced from mulberry trees, rice straw, and other plant fibers. In recent years considerable quantities of tough building paper have been made from imported Manila hemp.

The native paper is designed for many special uses. There is a bewildering variety of Japanese writing paper and many kinds of paper are produced for industrial use that are never heard of outside of Japan. However, considerable quantities of native-style paper were exported. The best known are *tengujo*, made from mulberry leaf fiber in Kochi prefecture in Shikoku, and several varieties of rice paper. Exports to the United States were relatively large. Japan furnished us with a considerable part of the heavy paper used in mimeograph stencils, as well as facial tissue and the fine, soft paper used in packing jewelry.

The production of all kinds of paper was increasing in Japan before the war. This was one product for which the domestic market was always more important than the export market. With the re-establishment of economic stability after the war, there is no reason to believe that production will not continue to expand unless a world shortage of wood pulp develops.

#### PRINTING AND BOOKBINDING

Prior to the war 70,000 Japanese were engaged in the actual printing and binding of newspapers, books, and magazines valued at around \$60,000,000 annually, or some 2 per cent of the nation's total industrial output. Thus, this industry is relatively about twice as important in Japan as in the United States; it ranks approximately

the same as in such small, homologous, and highly literate countries as Denmark and the Netherlands. However, our per capita expenditure for publications exceeds Japan's, partly because Japanese publications are very cheap.

**Newspapers.** There were about 7000 newspapers in Japan prior to the war. No figures on their total circulation are available, but it is known to have been large. The circulation of the great metropolitan dailies is enormous. The *Asahi*, published in both Osaka and Tokyo, had a circulation of over 2,000,000, according to the latest available reports. The *Osaka Mainichi's* circulation has been well over 1,000,000 for a number of years, that of the *Tokyo Nichi-Nichi* has been around 750,000 for some time, and that of the *Tokyo Yomiuri* is almost as large. However, none of the provincial papers has a circulation of more than 50,000.

The advertising revenues of the great dailies are relatively small, therefore, unlike American newspapers, they have to make a direct profit on every copy sold. For this reason circulation figures are not artificially boosted.

There has never been a "free press" in Japan, as the expression is understood in the United States and England. In the days when political parties were tolerated, the newspapers backed the candidates of one party or another, but outright opposition to established government policy was likely to bring about the suspension of the paper and the arrest of the editor. Criticism of the military forces, particularly the army, was always dangerous. The occasional mention of any of the several gangster-like ultra-nationalist societies was likely to result in "editorial murder." The police continually sent around lists of subjects that could not be mentioned in the paper. All this was true before 1938. Since then the newspapers have been completely under the control of the propaganda bureau and told exactly what they could print.

On the other hand, libel laws are practically non-existent or non-operative. There is no limit to the sensational exploiting of scandal—as long as the scandal does not concern anyone in the royal family or any high-placed figures in the current ruling clique, or is not likely to bring discredit to the army or navy. Otherwise the papers can and do indulge in yellow journalism at its worst to gain circulation. They publish lurid and highly sensational continued stories, run contests, and publish jokes and poetry. Everyone in Japan can write the traditional seventeen- and thirty-one-syllable verses after a

fashion, and everyone is eager to see his stuff in print; therefore thousands of Japanese buy newspapers just to see if what they submitted has been published. Other circulation-promoting devices, such as a section of interest to women and children, comments on the radio, motion picture, and stage, and articles on flower arrangement and tea ceremonials, are featured in all the larger papers.

Newspapers are printed in the 3000 Chinese ideographs that every Japanese is supposed to have learned in the public schools. Some words, usually of foreign origin, are printed in one of the two Japanese syllabaries, and the pronunciation (and meaning) of some of the less-familiar ideographs is indicated in the margins by the same device. This means that typesetting is a major problem and the staff of compositors on any newspaper very large. Neither everyday speech nor literary language is used in the papers, the language is a cryptic hodgepodge that foreigners who know oral Japanese will find difficult to understand.

**Magazines.** More than 800 magazines were published in Japan, of which about 300 could be called "general interest" publications. The rest, some with a large circulation, served such special groups as trade associations and cultural and patriotic societies. The government listed 400 individuals or corporations that publish magazines. The Dai Nippon Yubenkai Kodansha Kaisha, usually called the Kodansha or (quite frankly) the "Magazine Trust," has nine publications whose total circulation exceeds that of all the others together.

The Kodansha was developed by Seiji Noma and at last reports was managed by his son Hisashi. Seiji Noma has been called, with his approval, the "Magazine King" and the "Mussolini of the Japanese magazine field." Significantly his leading publication, whose circulation is a million and a half, is called simply "King."

An American journalist described Seiji Noma as a combination of Horatio Alger and William Randolph Hearst with *Bushido* trimmings. The son of an impoverished Sumurai family—this combination of poverty and aristocracy always appeals to popular fancy in Japan—he began his business life as a primary school teacher, an honorable but notoriously underpaid profession. In 1910 he brought out the magazine *Yuben* (Eloquence), whose motto was "Good Manners and Customs Will Develop the Nation." He was habitually on the verge of bankruptcy for several years, but his method of furthering Japanese cultural conservatism, filial piety,

and Emperor worship, together with his ultra-modern circulation-promoting procedures, brought him great success. Basically he has always been an ultra-nationalist, and while he has not openly condoned the gangster methods of terrorism and assassination of the various cliques, he has continually shown his sympathy with their motives—to control first Japan and then the world in the name of the Emperor.

Four of Noma's publications can be called "general interest" magazines, each differs somewhat in point of emphasis. He has one all-fiction magazine, and one each for women, boys and girls, and young children. The *Shonen* (boys' club) and the *Shojo* (girls' club) each have a circulation of more than 1,000,000 copies per issue. In addition the Kodansha turned out phonograph records "of moral and cultural value"—homilies that sell by the millions.

**Book Publishing.** Bookbinding has been both an important industry and a high art for centuries, and the wide increase in literacy in the past few generations greatly increased the demand for books. Both the cost and the artistic value of the average book have of course been reduced by mass production. The usual modern Japanese book—that is, the type displayed by the thousand in the bookshops found everywhere in the cities—is cheap, poorly made, and paper covered.

The total annual output of books, as to the number of either books or titles, is unknown, but both have always been produced in large quantities. Book publishing is one industry that neither suffered nor benefited by government regulation, at least prior to the National Mobilization Act of 1938. Anyone who could hire a printer could publish a book. If it proved to be objectionable to the government or the army, both publisher and printer would be arrested for "harboring dangerous thoughts" or possibly on the more serious charge of lese majesty. Otherwise there was little or no control over the industry.

Although there were several large book-publishing firms, including the Kodansha magazine trust, most of the total output was probably produced by small, ephemeral establishments.

Japan led the world in the diversity of books and probably in the number of titles published each year. The reason for this is not alone the countless Japanese writers who turn out novels, poetry, and volumes of non-fiction on every conceivable subject; a huge number of foreign books are translated and published each year—many of

them without the knowledge or consent of the copyright owners. In the case of fiction—American, English, French, and German novels have been pirated in large numbers—the translation may be very free indeed, both situations and characters being altered to suit the Japanese taste. Japanese periodicals frequently complained that the book-buying public showed a preference for foreign titles and foreign authors.

In 1937 complaints quoting unnamed government officials began to appear to the effect that the reading taste of the Japanese people had been corrupted by foreign ideologies and by “light and trashy” books of all kinds. By 1938 informal restrictive measures were being imposed to the extent that the “cultural or patriotic” value of a book had to be demonstrated before the publisher could obtain the paper to print it. These restrictions were tightened as available supplies of wood pulp were reduced.

The Japanese followed every changing fashion in reading matter as in everything else. In 1934, right after Hitler came to power in Germany, there was an enormous demand for anything German, a dozen different translations of *Mein Kampf* sold furiously. In 1937–38—the war with China had just begun—soldiers’ diaries were best sellers, as were older books on Chinese travel. Then came a great revival of the old Japanese classics, including a translation of the *Genji Mono-gatari* tales into the modern idiom. Significantly, this was followed by a vogue for books written during or concerning the Tokugawa era when Japan was completely shut up within herself; they were the fashion in 1942 and 1943, as far as is known.

The publishing industry will probably have the same relative importance in Japan’s economic life after the war as in the pre-war years.

#### MISCELLANEOUS

The Japanese listed under “miscellaneous” a large number of industrial activities that cannot be conveniently classified in any of the foregoing categories. Together these industries had an annual output valued at between 300 and 400 million yen, around 3 or 4 per cent of the nation’s total industrial production, and employed more than 200,000 workers. These industries include the production of cement, motion pictures, the processing of the by-products of gas and electric plants, and tobacco processing.

**Cement.** A recent development in Japan is the cement industry, which annually turns out more than 6 million long tons valued at 30 million dollars. The rapidly growing reinforced concrete construction program for new bridges, factories, and business structures will presumably increase this output in the future. At the time of the earthquake in September, 1923, substantially every ton of cement used in reconstruction in Tokyo and Yokohama had to be procured abroad, whereas today Japan is entirely independent of foreign sources. Incidentally, cement is a type of product that well repays domestic production, because so large a proportion of its marketed cost represents transportation and the commodity itself has a high water-damage coefficient in ocean shipping. Moreover, the utilization of basic slag, a derivative of smelting iron ore, provides ready and profitable disposal of a waste product. Although Japanese cement is said to possess lower unitary resistance than the American, it can be used in larger proportions in sand or gravel mortar mixtures and the resulting concrete will still be far cheaper than that made with imported cement. Even with peacetime freight rates the ocean-haul cost of cement exceeds the cost of manufacture in Japan. The cement industry is thus genuinely profitable, to both national economy and entrepreneurial self-interest.

**Motion Pictures.** Though the world at large and the United States in particular have small knowledge of the fact, Japan was for several years prior to the war the largest producer in the world of motion pictures for strictly home consumption; she probably produced more individual pictures—that is, what are known in the trade as “master prints”—than were produced in the United States in any recent pre-war year. The claim is made that about 700 so-called “feature pictures” were made in 1937.

The cost differential between Japanese- and American-made pictures is startling. What corresponds to our Class B pictures that cost around \$100,000 was produced in Japan for from \$1000 to \$3000, and some for even less. “Superproductions” cost around \$10,000; however, a special, de luxe, and very long version of “The 47 Ronin,” always most popular with Japanese audiences whether on the stage, screen, radio, or in a story-telling booth, is said to have cost \$300,000. The reasons for this difference in cost are the same as in any other industry—low overhead and low salaries and wages. A top-flight director received \$6000 a picture as opposed to the \$150,000 or \$200,000 paid in America. Other Japanese directors

may make less than \$200 a picture. One hundred and fifty dollars a month was a good salary for a leading actor, \$15,000 would be rather small for a star in America. Ordinary studio help was poorly paid by our standards, though they were among the best-paid workers in Japan.

Before the war the price of admission to the best first-run houses in the large cities was 15 to 40 cents and 3 to 12 cents for the smaller theaters; small-town and suburban shows charged about 3 cents. Attendance was good; it averaged about fifteen entrances per person per year—about half that in the United States. The average gross per picture was about \$15,000, which was very good in view of the low production cost. The eight corporations that made about 90 per cent of the pictures showed an excellent annual profit.

Only about half of the pictures were made with recorded dialogue. Whether they were or not, a commentator in the theater always supplied a running patter of dialogue and explanation. These commentators were very popular and many had a wide personal following among movie goers.

Although some comedies were produced—they are sad enough from the occidental point of view—the preference of the audience was always for tragedy. Usually the cheaper the picture, the more lugubrious. Most of those made especially for neighborhood and small-town theaters ended in double suicides; the men who wrote these dramas were rated, and paid, on the basis of their ingenuity in devising new and different methods for two lovers to do away with themselves in the last hundred feet of film.

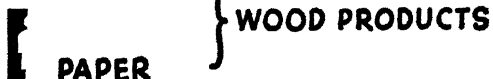
The Japanese motion picture industry will probably go its merry—or tearful—way much the same as it did prior to the war. Its product has always been designed solely to satisfy the demands of the home market, and, in spite of the popularity of American films in the larger cities, it has no serious competition.

In summing up the manufacturing situation it seems obvious that Japan will come out of this war with the capacity of some of her profitable light industries seriously curtailed, and with great over-expansion in her heavy industries—shipyards, smelters, foundries, steel mills, and the factories that produce machines, engines, motors, and machine tools. Most of these could not possibly operate under a system of free economy.

On the whole Japan built her manufacturing industry on a single

## WORKERS PER INDUSTRY

1936 FIGURES FOR FACTORIES EMPLOYING  
MORE THAN FIVE HANDS



} WOOD PRODUCTS



 = 50,000 WORKERS

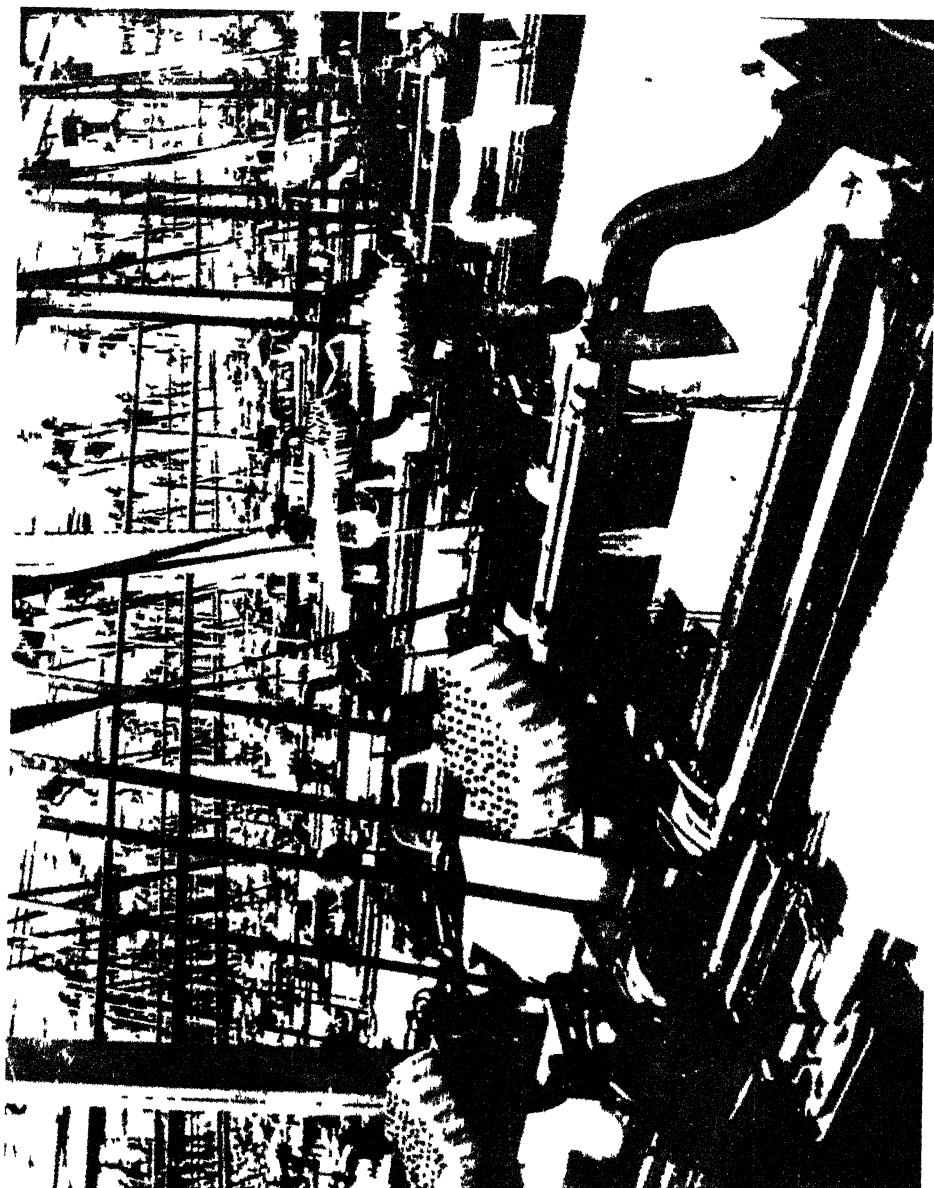


resource—a large, diligent, skillful population, aided by the fact that her industrialists have enjoyed the lowest fixed costs in the world. The cost of plant construction was only a small fraction of what it was elsewhere. Plant sites were cheap. Insurance premiums were small. Whereas the interest rates paid by farmers were fantastically high, the manufacturers, particularly those producing goods that were held to be eminently in the national interest, paid very low rates. Labor costs were low; but owing to several factors they did not as a rule have as important a bearing on the final cost as low overhead did.

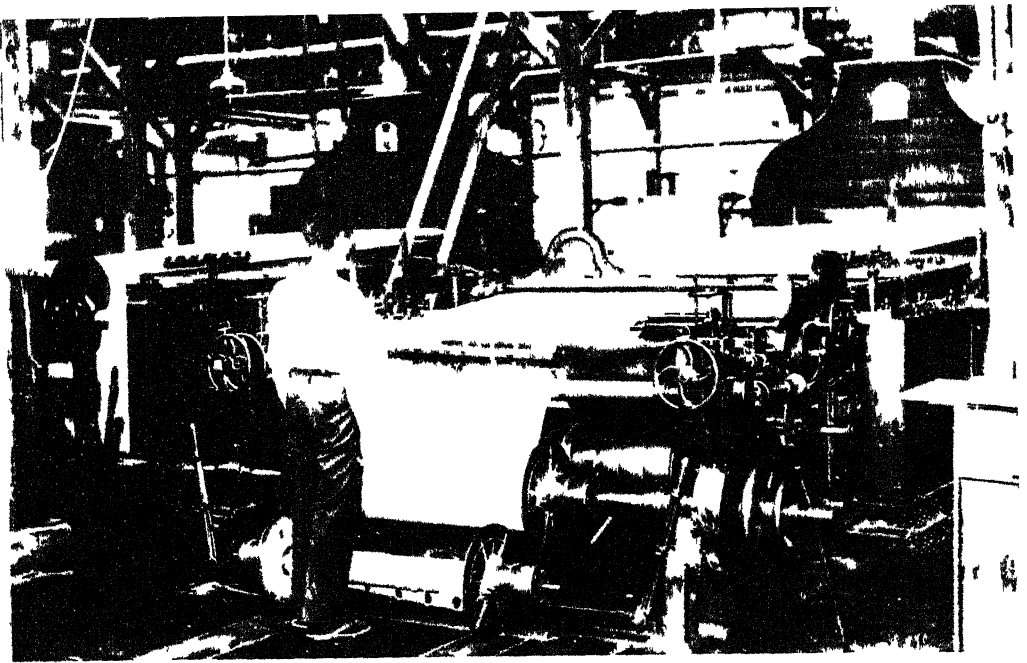
The advantage enjoyed by Japanese manufacturers from such amazing fixed costs was so tremendous that if it had not been for compensating disadvantages—imported raw materials, imported mechanisms (a constantly declining factor), and comparatively expensive power—the competitive impact on the world market of Japanese exports of textiles, many wood and porcelain products, and some of the simpler mechanical devices such as bicycles would have been catastrophic. This was low-quality merchandise in most cases, but merchandise that gave the customer his money's worth. Likewise it was usually the best he could afford, for the Japanese found most of their customers in low-income areas or in low-income groups. But in more complicated mechanisms where a nearly absolute standard of quality must be maintained in order to produce an effective article—for example, in many electrical mechanisms and in all devices that require precision fittings—the Japanese product was no cheaper, unit for unit, than that built in Germany or the United States.

resource—a large, diligent, skillful population, aided by the fact that American industrialists have enjoyed the lowest fixed costs in the world. The cost of plant construction was only a small fraction of what it was elsewhere. Plant sites were cheap. Insurance premiums were small. Whereas the interest rates paid by farmers were fantastically high, the manufacturers, particularly those producing goods that were held to be eminently in the national interest, paid very low rates. Labor costs were low, but owing to several factors they did not as a rule have as important a bearing on the final cost as low overhead did.

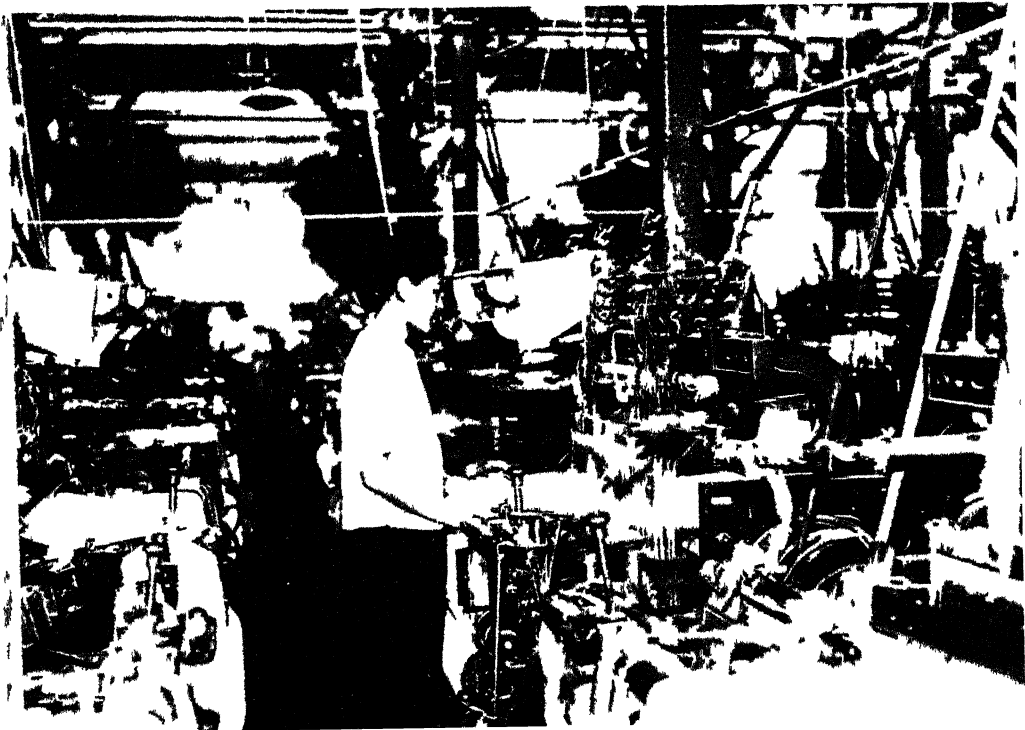
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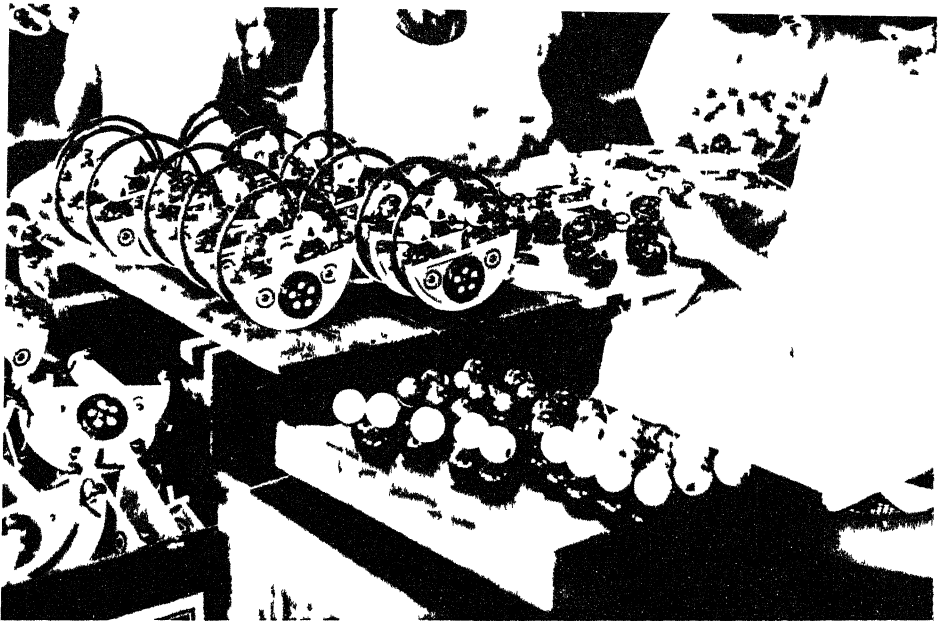


Spinning mills, Kanegafuchi, Japan. Until Japan shut down her profitable textile industry to make war, a total of ten or twelve million spindles was always busy. (*Wide World*)



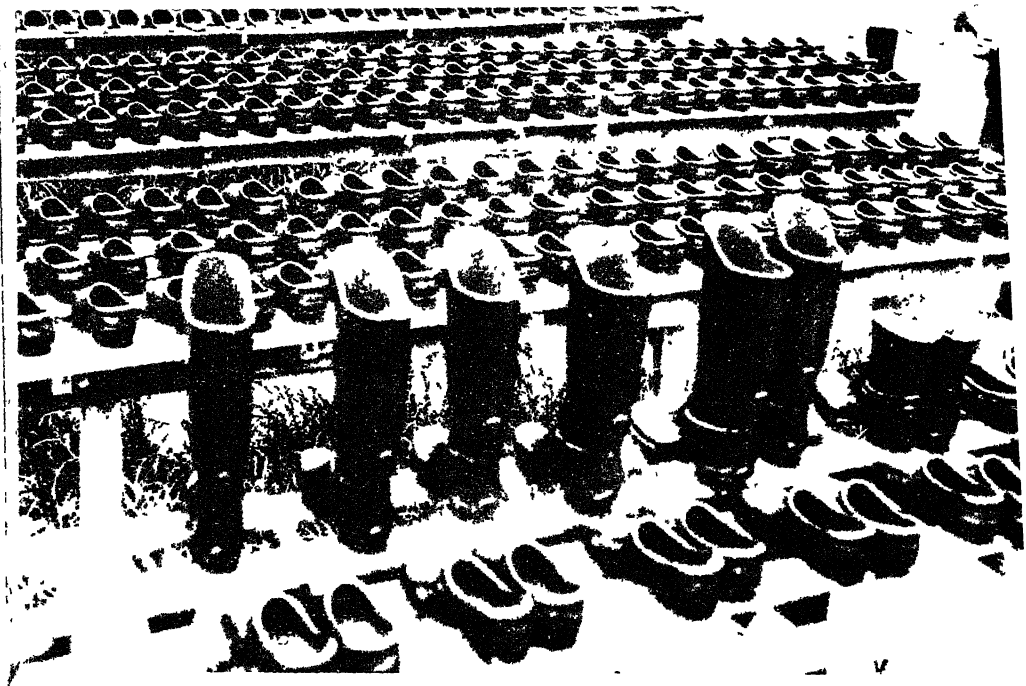
Making cotton piece goods, Japan's principal pre war export (*International News*)



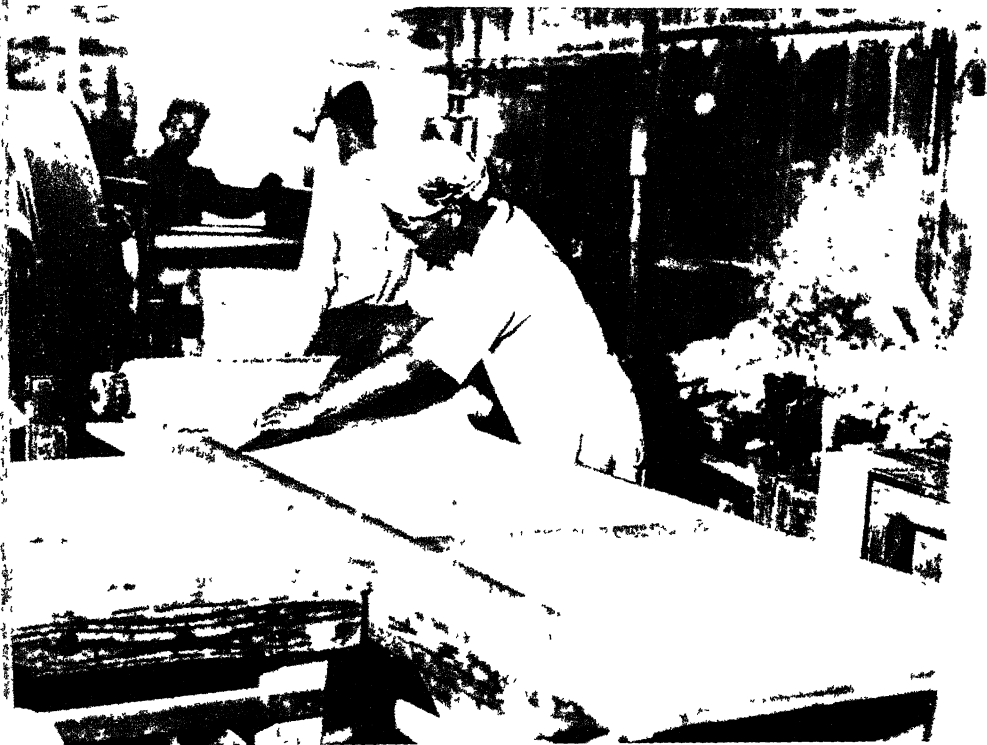


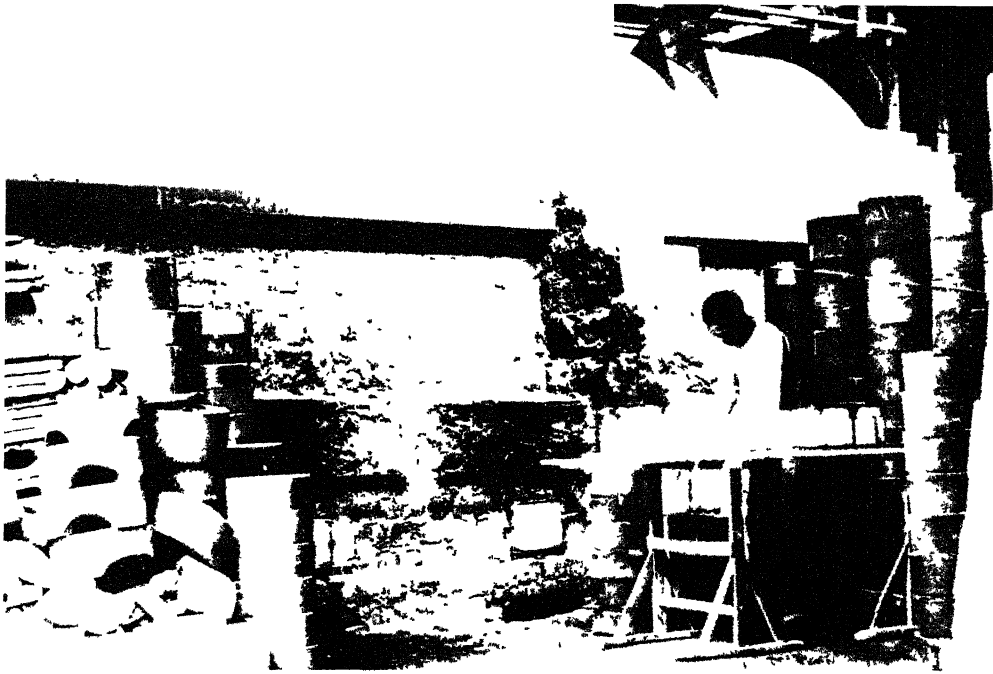
Toymaking was another profitable industry (*International News*)





The production of rubber boots and shoes and (*below*) of rubberized fabrics was likewise profitable (*International News*)





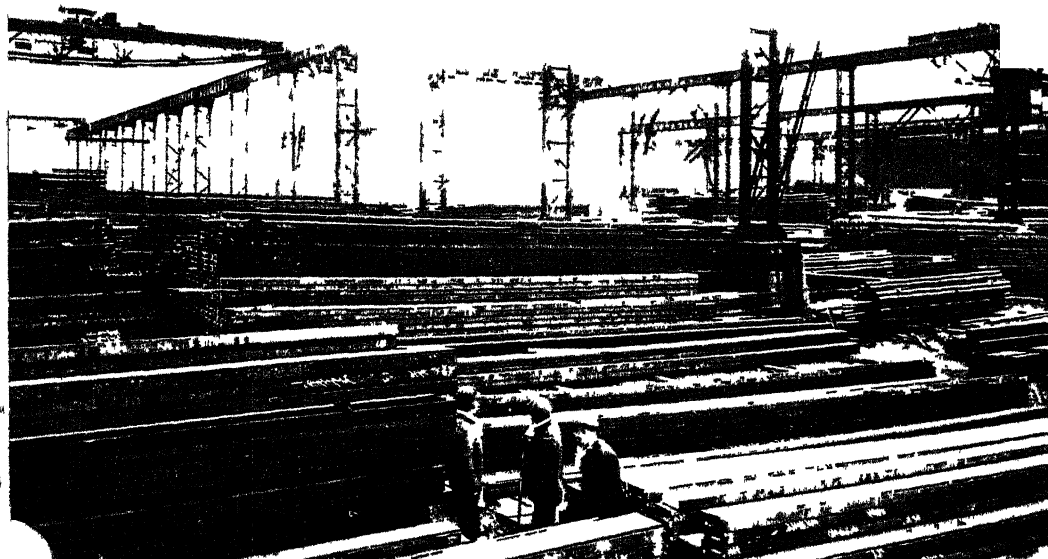
Pottery and chinaware were always money-makers. (Above) A pottery kiln (Below) Japanese artists decorating chinaware (International News)



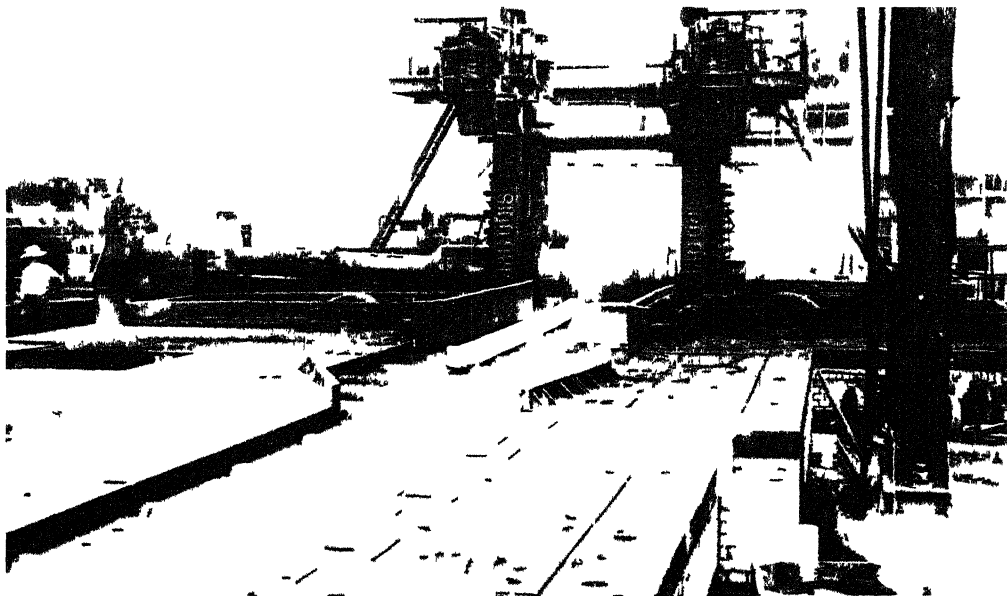


Only continual subsidies paid by the taxpayers and the consumers, kept Japan's war-essential heavy industries in operation. Here is the big government controlled Yawata Steel Works, Fukuoka prefecture (*Wide World*)

Part of Japan's pre war stock pile of structural steel (*International News*)

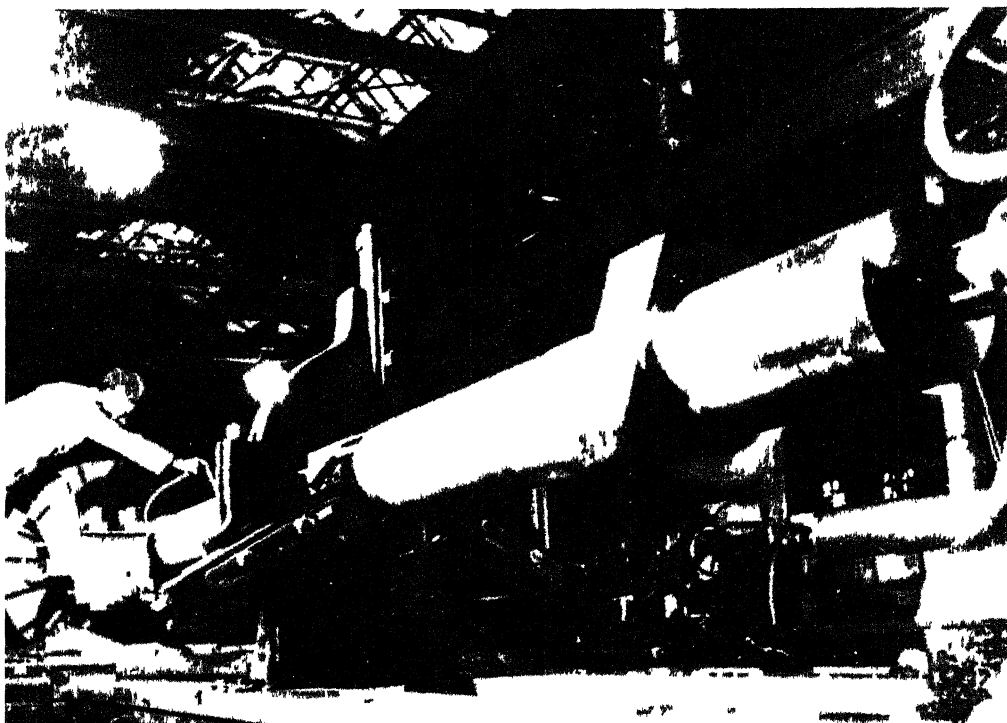


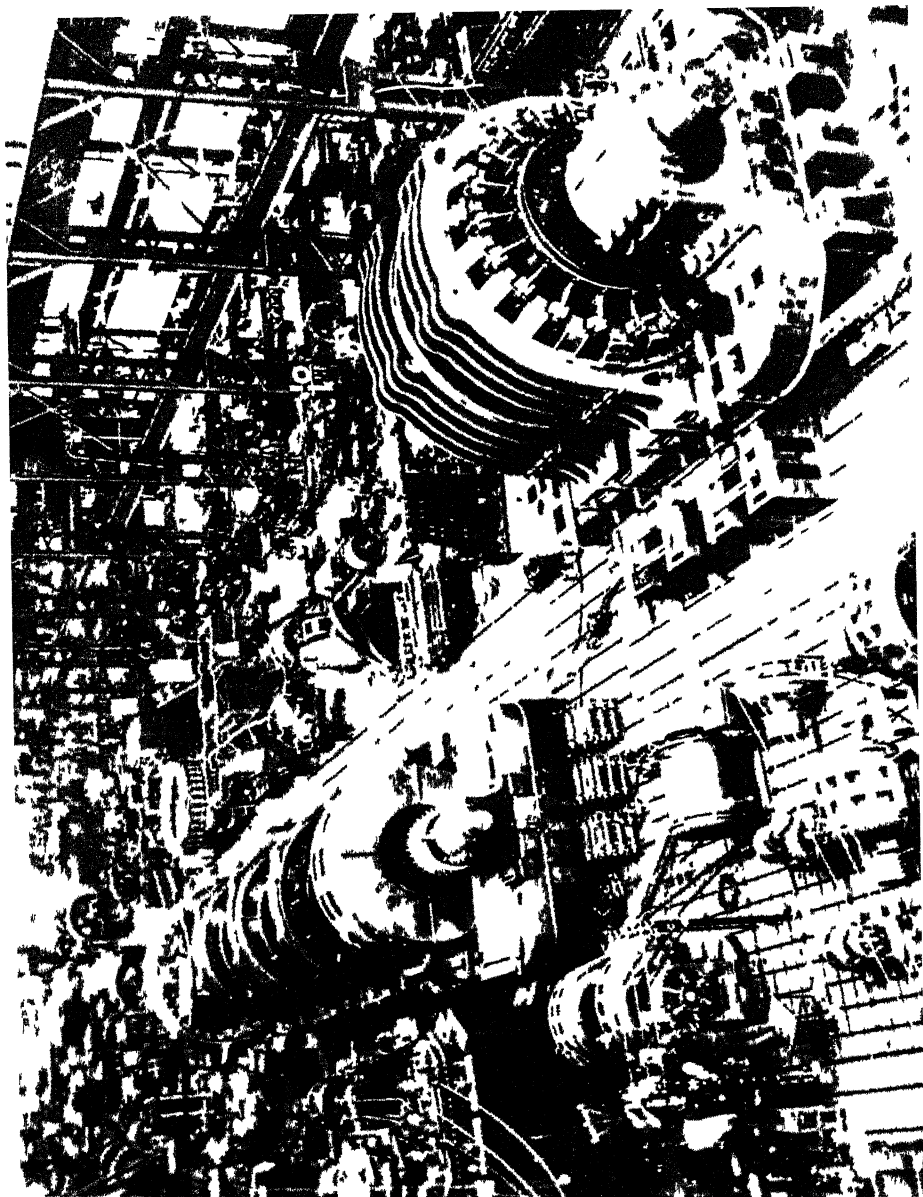




An obsolete German rolling mill operating in Japan (*International News* )

Tuning the barrel of a naval gun on a heavy-duty lathe (*International News* )





Large electric generators and  
motors being assembled in the  
Hitachi plant, Tokyo (Inter-  
national News)

# *A Summary of Japanese Resources*

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## INTRODUCTION

Purpose of the book: The importance of Japan in post-war trade between America and Asia. Five essential conditions in the rehabilitation of Japan. (1) conquest, (2) Allied administration, (3) readjustment to permit peacetime economy, (4) a change in social values; (5) abolition of subsidies to uneconomic industries and liquidation of tax burdens.

## RESOURCES INHERENT IN JAPAN'S POSITION AND CONFORMATION

Geographic position Japan's first great resource. The importance of an island's position relative to the sea lanes of the world, and of the size and industrial advancement of its population, in commerce and in war. Trade routes to east Asia more completely dominated by Japan's many islands than those to Europe are dominated by England. Japan's climate as influenced by position and conformation. The optimum climate for the development of human energies and intensive agriculture. Japan's conformation, in the location of harbors and channels, extremely favorable to commerce. Position and conformation important in effect, to both the psychological and the cultural make-up of the Japanese people.

## HUMAN RESOURCES

Japan's population her second great resource. The achievement of a people, as of an individual, the product of opportunity, plus certain qualities of body and mind and a state of cultural advancement that make it possible to take advantage of that opportunity.

Reasons why Japan's opportunity to become a world power came in the nineteenth century. (1) Growing commercial importance of the sea lanes between Asia and North America. (2) Political impotence of China. (3) Efforts of the European powers to strengthen

Japan in order to counterbalance or check some rival's influence in east Asia.

Reasons why Japan was able to take advantage of this opportunity. (1) A population that was exceedingly homogeneous, racially and psychologically. (2) The deep-rooted and fanatical reverence of the Japanese for national unity, as manifested in Mikado worship. (3) The ancient and persisting military tradition which was strengthened by the fact that they defeated a race of larger, stronger men. (4) The long experience of the Japanese in copying, adapting, and finally naturalizing an alien civilization. (5) The long period of isolation in which racial traits, good and bad, were intensified and crystallized in a set pattern, and during which a strong autocratic government, the rule of spies and censors, was established and tacitly accepted by the people as a whole as an inevitable corollary to essential unity. (6) Persistence, purposefulness, and ruthlessness, which are the outstanding qualities developed during Japan's unique history.

The genesis of the Japanese—an ancient synthesis of two or more races or subraces, their origin and place of amalgamation—two common physical types in the present race.

The primitive basis of Japanese government—the family council, the “clan” council, more properly the “chief's council.” The early unity of all local groups under one “king of kings,” the Mikado. The royal family in power so long that by the beginning of written history it was already reputed to have had a divine origin. Material culture of the early Japanese no further advanced than that of the aboriginal Ainus. Political unity the only advantage of the Japanese in their long war to dispossess the larger, stronger Ainus.

The early infiltration of elements of Chinese culture via Korea. The sudden appearance of Buddhist missionaries in the Mikado's court. Revolutionary changes. *De jure* authority still in the Mikado's hands today; *de facto* authority vested in the hands of “he who has access to the throne” about 550 A.D. Actual authority never regained by the Mikado. The various means by which “access,” i.e., the actual central authority in Japan, has been obtained throughout history.

Periods in Japanese history:

550–1085—Japan under the rule of court nobles. The importance of this period in naturalizing Chinese culture.

1085–1550—The feudal period. Struggle of the various factions of provincial nobles and their samurai (military gentry) to obtain “ac-

cess to the throne." Intrigue and duplicity a fine art. The decline of the central authority, the degradation of the Mikado's court and of Buddhism, the rise of the shogunate and the "cult of the warrior." The great influence of this period on the mass psychology of the present-day Japanese, particularly in the awe and admiration in which the average man holds him who has the courage to kill himself or another.

1549-1624—The Christian interlude. The arrival of Portuguese and Spanish missionaries; why they were first encouraged and why they were later expelled. Japan shut within herself by the first of the Tokugawas, except for restricted contact with the Chinese and Dutch.

1603-1868—The Tokugawa era. Characteristics and importance. Bureaucratic autocracy, the rule of spies and censors, superimposed on an aristocratic post-feudal social hierarchy that resembled the reign of Louis XIV of France. Internal order maintained better in Japan than in any country in Europe. The position of the provincial nobles, their samurai and peasants. Their financial ruin because of the gradual substitution of a money economy for a rice economy. The rise of the merchant class. The growth of the "clan companies"—merchants and money lenders who became manufacturers and shippers in the nineteenth and twentieth centuries.

The position of the Mikado's court. The results of the development of historical research—the revival or "purification" of Shinto and the growth of an undercover movement to restore the Mikado to actual power and to purge Japanese culture of all Chinese and other foreign elements.

The Sat-Cho coalition formed by the "outside nobles," the great daimios of the south who were excluded by the Tokugawas from any participation in the central government, to seize the "access to the throne." Their alliance with the ineffective and atavistic court nobles at Kyoto.

The coming of Commodore Perry and its consequences. The shogun, with his sixteenth-century military and naval organization, powerless against foreign intrusion. The end of the Tokugawas. The so-called "restoration." The reactionary court party double-crossed by the practical Sat-Cho nobles; the beginning of a program to modernize Japan in all her physical aspects.

1868 to date—The modern period. The actual Japanese government as opposed to its legal form. The constitution of 1880. The de-

cline of the Sat-Cho and the rise of the industrialists. The rise of the military cliques as representative of the ultra-national anti-foreign elements that have continued to be strong in Japan. Their political thought—both radical and reactionary. The importance of the Kwantung army as the nursery of these groups.

A summary of the characteristics of the Japanese people. How they may react to defeat. The necessity for a firm and just administration.

#### AGRICULTURE

Agriculture still Japan's most important industry both in capital invested and in net output.

Causes of the progressive debility of Japanese agriculture for many years: (1) Enormous burden of taxation. Most of the subsidies granted favored industries paid by agriculture. (2) Huge and mounting burden of private debt. Interest rates—farmer, 20 per cent; shipbuilder, 1½ per cent; other favored industries, only slightly more. (3) Decline in soil fertility and increasing use of expensive chemical fertilizers. Lack of fertilizers during the war. (4) Ever-increasing overpopulation in rural areas. (5) Deterioration of sources of subsidiary income, such as silkworm raising and charcoal burning.

Haphazard attempts by the government to alleviate the condition of the farmers.

The unique and important relationship between the agricultural classes and the army. Sons of farmers and landowners dominant in the ruling military cliques. Husks and hope of a vast Japanese empire the farmer's lot.

Liquidation of the farmer's debt load, reduction of taxes, and creation of the incentive to produce the first task of American administration.

#### AGRICULTURAL COMMODITIES

**Rice.** Half of Japan's 16,000,000 arable acres planted to rice. Methods of production, etc., described in detail. Future problems and suggested methods of solution.

**Barley.** Second in importance. A winter crop on rice paddies. Details.

**Wheat.** Large yield, poor quality. Details.

**Rye.** Formerly important. Sudden decrease in production probably due to rye blight.

**Other Crops.** Production of oats, millet, potatoes, sweet potatoes, and soybeans discussed.

**Tobacco.** Production details. Government monopoly. Excellent future in free market after the war.

**Tea.** Production details. Problems. Production limited by government policy. Increase after the war indicated.

**Garden Vegetables.** Types produced. Growth of canning industry.

**Fruit.** Types produced. Importance of the Satsuma orange. Growth of canning industry.

**Pyrethrum.** Importance of this insecticide. Production problems and future of the industry.

**Peppermint.** Details. Future production indicated.

**Forest Products.** Details on production and consumption of forest products, forestry management, etc. Camphor production.

#### ANIMAL INDUSTRIES

**Sericulture.** Japan largest producer of commercial raw silk in the world. Production methods. Experimentation. Reorientation after 1939. Importance of raw silk to Japan in the past. Factors that will determine whether this industry will or will not be rehabilitated after the war.

✓ **Fishing and Allied Activities.** Japan's supremacy in the amount and value of marine products and in number of workers engaged in gathering and processing them. Fish the principal source of protein in Japanese diet. Exports of marine products exceeded only by cotton textiles and raw silk.

The distinction between coast fishing and deep-sea fishing in Japanese terminology. Types of activities included under each. Relative importance. Types of licenses granted for taking or producing marine organisms. Number and relative importance of each.

Details on the cultivation of many types of marine and fresh-water organisms—fish, shellfish, seaweed; the Mikimoto method of pearl culture.

Details on several types of deep-sea fishing—trawling, shark, tuna, and bonito, crab; the floating canneries in Siberian waters. Salmon fishing, and floating canneries; the two great fishing trusts and their importance to Japan's war effort. Whaling, its importance to Japan in the pre-war period.

Prognostication of the trend of the marine products industry after

the war, and the problems the occupation administration will face in this regard.

**Livestock.** Japan's pre-war position in livestock production weak. Reasons

*Cattle.* Details on beef and dairy products. History of the industry. Limiting factors. Principal producing areas.

*Horses.* Unique position of horse-breeding the result of army sponsorship. Persistence of the ancient cult of horse worship. The breeding and importation of Thoroughbreds (race horses and Irish hunters). The importance of horse racing in Japan. Many tracks. Expensive installations. Huge expenditures in relation to low average income of the population. Many small local tracks.

*Swine.* Important only in Yokohama area. Details.

*Sheep.* Small production despite efforts of government. Details.

*Poultry.* Production relatively important. Fancy and utility breeds. Scientific methods developed by government-sponsored research. Chick-sexing—Japan's gift to the poultry industry.

## MINING

Japan's early wealth in metals important historically. Rise of coal production. Reserves of both metal and coal insufficient to meet the needs of a first-class industrial nation. The continued exploitation of uneconomic mines the result of the struggle for self-sufficiency.

**Coal.** Annual production and estimated reserves. Uneconomic mines. Less than half of those in production at the outbreak of war suitable to compete with foreign coal on a free home market. Quality; lack of good coking coal. Coal areas.

**Copper.** History. Ownership of mines. Size and nature of production. Much of present production uneconomic.

**Gold.** Production figures. Gold as a by-product. Alluvial gold. Government effort to increase production. Insignificant post-war production indicated.

**Iron Pyrites, Petroleum, Silver, Zinc, Sulphur, Lead, Aluminum, Manganese, and Magnesium.** Separate sections devoted to each.

Relative position of Japan in world mineral production before the war; post-war prognostication.

## TRANSPORTATION

**Merchant Marine.** The importance of Japan's merchant marine increased by the inadequacy of her railway trackage. The size of her



merchant marine as of July 1, 1939—2225 vessels totaling 5,629,845 gross tons. Japan's minimum essential needs: 1 million tons to handle the normal peacetime inter-island and coastal traffic, and 2½ million tons to transport goods to and from the immediately adjacent coast of Asia, traffic absolutely vital to her industry.

Heavy loss of Japanese shipping in the war.

Types of Japanese merchant ships. Motor ships increased prior to the war.

Huge increase in shipbuilding promoted by the government subsidization program between the two World Wars. Price differential in favor of Japanese shipbuilders. Three factors to be considered in considering Japan's post-war shipping: (1) a minimum need of 3 million tons; (2) importance of the carrying trade in Japan's economy; (3) limitations on Japanese shipping and shipbuilding obviously required for future international security. Necessity of limiting the length and speed of vessels.

Railways. 15,000 miles of trackage. Good equipment. Serious deterioration because of the wartime overload. Details. Nature of peacetime traffic. Excess of passenger over freight revenues. Recent improvements. Post-war prognostications.

Canals. Nature and importance. Type. Kind and amount of traffic handled. Pre-war expansion projected.

Motor Transportation. Latest peacetime figures on cars, trucks, and busses in use. Factors making for Japan's comparative poverty in motor transports: (1) low average income, (2) government policy; (3) lack of gasoline. Military confiscation of private cars and trucks. Short-haul busses. Post-war problems. Influence of local conditions on kind and size of motor vehicles.

Air Transport. Late development. Military domination. Need for operation by the administration authority for many years after the war. Japan's legitimate needs for internal air transportation.

#### TELECOMMUNICATIONS

Telegraph. Early history. Statistics on line mileage, stations, messages, etc., in 1936. Totals exceeded only in the United States. Other comparisons. Lack of up-to-date equipment. Government ownership.

Cables. Monopoly by English-owned Great Northern Telegraph Company. Virtual confiscation by Japanese government in 1940. Statistics on messages handled, number and length of cables in operation.

**Telephone.** History. Number of phones in operation in 1940 in Japan and in other leading nations. Excessive number of calls per subscriber per year. Reasons: lack of sufficient installations; restrictive policies of the government monopoly, heavy cost to subscribers. Social and commercial importance of telephones to the Japanese. The telephone monopoly the servant of the army. Need for adequate modern equipment.

**Radiotelegraphy.** Ship-to-shore installations. Transoceanic installations. Number of transmitting and receiving stations. Colonial communications. Aeronautical stations. Weather stations. Time stations. Details on equipment.

**Radiotelephony.** History. Transmitting and receiving stations, equipment, etc.

**Radio Broadcasting.** History. Direct government control. Receiver license details. Nature of programs. Propaganda and indoctrination. Good equipment; details. Number, size, wave length, location, and range of stations.

## CITIES

32.7 per cent of Japan's population urban. Location of areas of great concentration; the cities therein, and their size. Proportionately large urban population even in the Middle Ages.

Japanese group-minded. Their desire for crowds. Population congested even in rural areas.

Types of structures in various Japanese cities. Details. Reasons for variations in different areas. Political subdivisions within cities.

**Tokyo.** Area, population, recent history, construction, commerce, and industries. Details. Other cities in the Tokyo Bay region—Kawasaki, Yokohama, Yokosuka—and Nagoya dealt with at some length in separate sections.

**Osaka Bay Cities.** Details regarding area, population, etc., given for Osaka, Amagasaki, Kobe, and Kyoto.

**Other Cities.** Details regarding population, etc., for Hiroshima, Kure.

**Shimonoseki Straits Cities.** Details on Shimonoseki, Moji, Kokura, Yawata, and Fukuoka according to importance.

**Other Cities.** Details on Nagasaki; also on Kagoshima, Kanazawa, Toyama, Niigata, Hakodate, according to importance.

## COMMERCIAL AND INDUSTRIAL MONOPOLIES

A description of the fifteen holding companies—Mitsui, Mitsubishi, etc.—that together transacted about three-fourths of all of Japan's business, internal and external, before the war. Details on the most important firms, their history, the nature of their holdings, their conflict with and final capitulation to the military. Also such details as are known regarding the expropriation order of January, 1943. A prognosis.

## FINANCE

National debt. For fifteen years prior to World War II, Japan's budget balanced by borrowing. Eleven types of internal loans. Eight types of external loans. Details. Total bonded indebtedness of Japanese government 38 billion yen by 1943. Total national wealth, about 110 billion yen. Distribution: 84 per cent private, 16 per cent government and public.

Currency; its fluctuations and recent decline in value—the consequence of fiscal deficiencies and government manipulations.

Tax structure; details on several of the twenty-seven tax categories.

Banks. Classification of banks. Details regarding the size, number, importance, functions, and management of the institutions in each group.

The lack of detail on the proposed banking reorganization announced by the Tojo government in 1943.

## FOREIGN TRADE

The nature, size, and relative importance of Japan's foreign trade in recent pre-war years. How it has been largely motivated by two nationalistic considerations—the acquisition of foreign currency and of military and naval stock piles. How Japan has wiped out the commodity balance against her by the sale of services to other countries.

The kind, source, and amount of Japanese imports.

The kind, destination, and amount of Japanese exports.

A prognostication of the nature and relative importance of Japan's foreign trade under a system of free economy after the war.

## HYDROELECTRIC DEVELOPMENT

The social and industrial importance of electric power to the Japanese. Nature of installations. Widespread use. Importance in small household factories. Consumption. Ratio of thermoelectric to hydroelectric generation. Dam construction. Relative position of Japan as a consumer and producer of electric current.

History. Government regulations. Post-war problems. Prognostication in view of Japan's total hydroelectric potentials and ever-decreasing coal reserves.

## MANUFACTURE

Japan's industries in 1870 only fifty years—not "a thousand" years—behind the western world. Conditions that made for speedy industrialization: strong government, close social integration, large urban population and well-established internal trade, advanced handicrafts, and great aptitude in copying and adapting foreign techniques.

The pattern of Japan's modernization: (1) Production of native artifacts by handicraft methods; (2) production of foreign-type consumer goods by imported machines; (3) production of machines in Japan, and hence the development of heavy industry. The Japanese aim—to import only raw material to Japan proper and to export completely finished goods. To this, the control of the source of raw material—where possible—was a corollary.

Japan's light industries exceedingly profitable. Japan's heavy industries—except shipbuilding—generally unprofitable. Development by means of heavy subsidies a military necessity.

Reasons for Japan's industrial success. A large and industrious population. Low fixed costs to manufacturers—cheap plant sites, low building costs, low interest rates, cheap insurance, and cheap labor. An undeveloped market for cheap goods among low-income groups, particularly in Asia and the East Indies.

Failure in certain heavy industries and in intricate mechanisms due to high cost of fuel and lack of skill in precision machinery.

Importance of the small household factories in modern Japan. Characteristics—output, equipment, labor costs, etc. Subcontractors in war work.

The large factories—characteristics and contrasts.

General survey of the eight major manufacturing categories. The value of the output in each in 1936, the last peacetime year—13 billion yen or 4 billion dollars. Three million employees in the larger factories. Horse-power to man-power ratios. Value of output in each category.

**Textiles.** One million employees. Output valued at one-third of Japan's total output. Greatest source of export in late pre-war years. Efficient industry. Great technological advance. Sudden and almost total eclipse because of the war.

**Cotton.** Primary importance (Japan's largest export). Characteristics—import of all raw material, export of finished or semi-finished product. Technical advance. The Toyoda automatic loom, Japan's most important invention. Managerial efficiency. Contract labor—details. History of the rise of this industry and its abrupt decline after the 1938 edicts. Post-war prognostication.

**Rayon and Staple Fiber.** The development and the late pre-war importance of the rayon industry. Production figures and export data. Cheap goods for a cheap market. Post-war prognostication.

Staple fiber a wartime ersatz industry. Prognostication.

**Silk.** Importance. Production and export data. Prognostication.

**Woolens.** History. Import and export data. Problems. Prognostication.

**Other Textiles—Flax, ramie, jute, sisal, hemp, Manila hemp, etc.** Details on production, markets, etc. Prognostication.

**Metals and Metal Products.** Heavy industries largely the result of the national urge for industrial self-sufficiency, particularly in the production of arms. Largely uneconomic. Heavy subsidies, direct and indirect, paid by agriculture and the efficient and profitable light industries. The automatic collapse of these industries following the removal of all artificial props, such as tariffs and subsidies. The great economic benefit therefrom.

**Iron and Steel.** Japan's plant capacity for pig iron and steel ingot production. Production figures. The 1938–41 trend.

Alloys. High-frequency steel production. Japanese claims.

Large post-war reduction indicated. Late pre-war imports of iron and steel scrap.

**Other Metal Products.** Copper, zinc and lead, and aluminum discussed briefly.

**Machinery and Vehicles: Industrial Machinery.** The pattern of development. "Part-by-part" copying. Assembling parts copied from

arious similar machines and combined in a single mechanism. Modification of parts to fit a machine of somewhat original design particularly adapted to Japanese needs. Great ingenuity shown in adaptation and improvisation. Deficiency in precision fitting. Absolute superiority seldom achieved in any Japanese mechanism. Exception—textile machinery, especially the Toyoda loom. Types of industrial machines in the production of which the Japanese claimed self-sufficiency before the war.

*Engines and Motors.* By 1939 Japan independent of rest of world for engines and motors of all sizes and nearly every type. Substantial imports of autos and trucks (and parts) for military purposes.

*Prime Movers.* Production of steam engines and boilers.

*Marine Engines.* Reciprocal. Turbine.

*Diesel Engines.* Japanese firms licensed to build many Diesel-type engines.

*Electric Motors and Generators.* The world's largest generator completed in 1940 for the Yalu River project.

Details on generator production. Production of large electric motors and of small motors and electrical gadgets (consumer goods).

*Machine Tool Production.* Machine tools defined and classified.

History of machine tool production in Japan. Character of production, 1938–40. Dependence on Germany and the United States.

Importance of the production of small basic machine tools for the one-family shops in Japan's industrial slums.

Japan's industries, as a whole, still inadequately tooled.

Japan's machine tools not good but cheap. No competition with the United States in high-precision or "special job" tools.

*Railroad Equipment.* Details. Manufacturing centers.

*Airplanes.* General characteristics of Japanese production methods as illustrated by the Mitsubishi S-00 fighter planes. Japanese ingenuity in copying various features of foreign planes and putting them together to make a plane of their own, the design of which is itself an adaptation of borrowed elements.

*Vehicles.* Size of automobile manufacture in Japan. Characteristics and shortcomings. The Japanese willingness to spend a large part of income on pleasure travel. Economic factors that have hindered its development. Factors that will aid the production of small cheap cars under a system of free economy.

Bicycle production. Japan largest producer of bicycles in world.

Characteristics. Organization. Assembly plants. Cheap production. Foreign markets. Marketing methods.

**Chemicals.** Relative importance of chemical industry in Japan. Value of total output; total employment figures, 1936, 1938. Chemical production classified. The nature and size of Japanese production of bulk chemicals, alkaline fertilizers, explosives, etc.; the source of supply, the struggle between military and agricultural necessity. Prognostication under new economy. Detailed discussion of petroleum and synthetic petroleum products, dyestuffs, soaps and cosmetics, drugs, glass and glassware, and rubber goods. Prognostications.

**Foodstuffs.** Important growth of canning, freezing, dehydrating, etc., industries in Japan. Data on late pre-war production and on number employed. Foreign trade.

**Clay Products.** Production figures. History of the industry. Grades. Wide range of ceramic products. Substitution of ceramic materials for metals.

**Wood Products:** *Timber.* Nature, size, and origin of imports. Extensive use of wood and wood products in Japan. Importance of plywood and veneer.

*Paper.* Great importance in the Japanese economy. Large per capita consumption. Production figures.

Foreign-type paper. Newsprint, other types. Huge consumption.

Japanese-type paper. Manufacturing methods and raw materials. Building paper. Writing paper. Other types.

**Printing and Bookbinding.** The production of newspapers, periodicals, and books relatively more important in Japan than in the United States. Circulation of the great metropolitan dailies. Characteristics of the contents of newspapers.

The number and character of Japanese periodicals. The so-called "Magazine Trust." Seiji Noma.

Book publication. The size, importance and characteristics of the industry. Restrictions. Literary tastes.

#### **Miscellaneous.**

**Cement.** Japan self-sufficient in cement production. Six million long tons a year. A profitable industry with bright future.

The size, importance, and characteristics of the motion picture industry. Nature of the product. Emphasis on traditional tales. Characteristic emphasis on tragedy in Japanese pictures. Production methods and other technical data regarding this industry.





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